[Version 1.0]
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Rock Mallin

[Micro-EX User Manual]

This document will introduce you to the wonders of the MallinCam Micro-EX Camera. It will include instructions on how to connect the Micro-EX to your computer along with explanations of the camera's various settings. Imaging techniques with the various hardware and software options will be covered. The standard Composite Video output will be discussed along with hints and suggestions on how to resolve any problems that you encounter with this camera. Enjoy the adventure with Rock Mallin's Micro-EX Video camera, which will introduce you to the amazing field of near Real Time video imaging.

Revision History

Version	Date	Revision Description
1.0	6/05/2014	Template Creation and Micro-EX Wired

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1. Introduction

Welcome to the world imaging with the MallinCam Micro-EX, a hand-crafted Colour Astronomical Video CCD Cameras with a 1/3 inch 960H EXview HAD II CCD sensor, allowing a choice of a variable shutter with exposures from 1/100000 of a second to 17 seconds. In-camera image averaging of up to 85 seconds are possible when set to 5 frame stacking (NTSC)

Your purchase will provide you with years of discovery and adventure as you view, record, share, and broadcast the wonders of the Night Sky. The Micro-EX captures images that range from brighter Deep Sky Objects to local Solar System favorites, and it does this in near Real Time. You will discover that this camera can be used in urban skies where light pollution normally prevents you from viewing images the sky, to rural locations where you can pull out even those faintest celestial wonders; this camera can do it all.

The rear section of the camera has five push buttons for easy access to the menu. A RED pilot light is included to prevent loss of night vision of the user. Light weight all aluminum construction; this camera is ideal for a Video CCD Finder System or for a beginner to get their first experience into the world of live video CCD observation. The camera body is available for purchase separately, or as a package with additional accessories such as C-mount to 1.25" adapter, video/power cable and AC power supply.

The Micro-EX has a BNC video output port (Composite) which can be connected to either a monitor or a computer with video-in capabilities. MallinCam has available all the necessary adapters to allow the Micro-EX to connect to your equipment. The MallinCam Micro-EX also has the ability to be controlled from a Windows computer via an optional RS 485 cable assembly.

This manual is in the way the work of the MallinCam Micro-EX users before me. I have borrowed their ideas and even some of their documents and have placed them in the manual so that we have everything is in one place. Special thanks to Jack Huerkamp for all the preliminary work he has done with this camera.

So thank you for your purchase, and let the adventure begin

The Contents of the Micro-EX Package

Depending upon the Micro-EX Model purchased, the contents may vary, but all Micro-EX Deluxe cameras include the following standard equipment:

MallinCam Micro-EX Deluxe Package:

- Micro-EX camera body
- C-mount to 1.25" eyepiece adapter
- AC power supply
- 25 feet video/power cable
- BNC to RCA adapter

Micro-EX Optional Cables:

- 2m RS 485 cable assembly

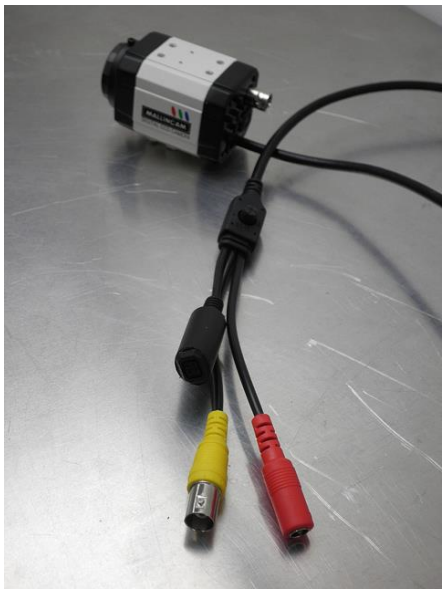
These attachments will provide you with the ability to connect the Micro-EX Video camera to your telescope, power it using to a 120V AC power source, and displaying your image on any device that accepts analog video via a composite connection. The optional cables will allow you to control the Micro-EX either through your computer. See the **Appendix** for a list of other accessories available for the Micro-EX.

MallinCam Micro-EX with Wired Remote Package

This version on the Micro-EX has all controls and outputs on the back of the camera disabled (Power, BNC, Auto IRIS, and 5 buttons). Connection to 12V power, BNC composite video, and control of camera are accomplished through the controls at the end of the 2m cable

- Micro-EX camera body
- C-mount to 1.25" eyepiece adapter
- AC power supply
- 25 feet video/power cable
- BNC to RCA adapter

Micro-EX



Micro-EX Wired

1.25” Eyepiece adapter

BNC to RCA adapter

The Camera (Just the Facts)

The MallinCam Micro-EX Camera is a video camera that provides near Real Time images of brighter Deep Sky Objects, Planetary, Lunar, and Solar. This instrument contains the following specifications:

Model	Micro-EX
Image Sensor	Sony ICX672AKA EXview HAD II plastic ccd
CCD Pixels:	976(H) by 494(V) effective 5.0 μm x 7.4 μm Pixel size
CCD Size:	1/3“
Video Output Format:	NTSC
Composite Video	BNC Female Connector
Gain Control:	Auto/Manual
Exposure Control:	Auto/Manual
Auto Iris:	AES (Rolling Shutter), ALC
Fix Shutter (seconds)	1/60, 1/100, 1/120, 1/250, 1/500, 1/1000, 1/2000, 1/4000, 1/10000, 1/100000
Extended Shutter (seconds)	1/32s, 1/16s, 1/8), 1/4s, 1/2s, 1s, 2.1s, 4.2s, 8.4s, 17s
Stacking Mode	Up to 85 s
Gamma Selection	0.30 / 0.45 / 0.6 / 1.0
White Balance	-Automatic White Balance Control (ADR) -Auto Trace White Balance Control (ATW)
Digital Zoom	
Communication Protocol	RR485
Operating Temperature	-30°C to 50°C (-4°F to 122°F)
Power Supply	12±1V DC at 1A
Weight	5.0 Ounces (141 grams)

The Camera (its Anatomy)

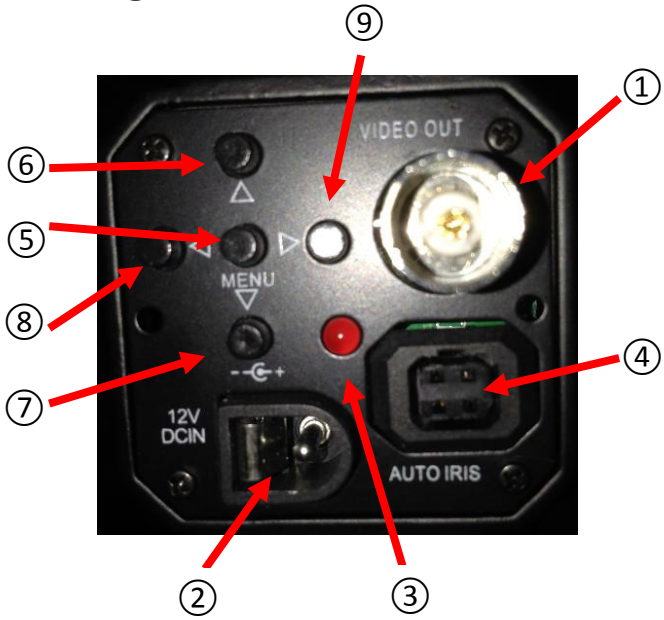
The Micro-EX camera is 4.5" x 2" x 2" and weighs in at about 5.0 ounces (141 grams).

2. Making Connections

The Camera (Connection Diagram)

Micro-EX

1	Video Out (BNC)
2	12V Power in (12V)
3	Red Power on LED
4	Auto Iris Port (for RS485)
5	Enter Key
6	Up Arrow
7	Down Arrow
8	Left Arrow
9	Right Arrow



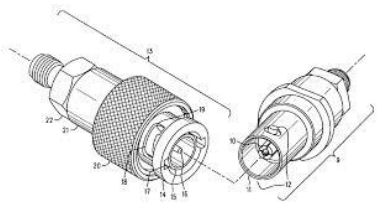
Connecting Micro-EX to Monitor

The MallinCam Micro-EX provides a BNC Video Out Ports that allow the video signal to be distributed to Video monitors. This Video Out Port provides standard Composite video out by the BNC connector on the back of the Micro-EX (*1 on the above Connection Diagram*).

Composite

The Composite Signal is obtained by connecting the included MallinCam Video Cable from the back of the Micro-EX to the Composite Video-In Port on your monitor (*since in most monitors, the Composite Video-In connector is a RCA style, MallinCam provides a BNC to RCA adapter to facilitated that connection*).

To connect, just align the two little openings on the BNC cable (*male*) with the two notches on the Micro-EX's BNC (*female*) connector, push and twist so the notches slide into place. This locks the cable to the Micro-EX.



Micro-EX Wired Remote

Just an in the Micro-EX, The Micro-EX Wired provides a video connection to an external monitor or computer. The Micro-EX Wired's active composite video output is located on the end of the 2m cable extending from the back of the camera. The Composite Signal is obtained by connecting the included MallinCam Video Cable to the Yellow BNC connect on the end of the 2m cable to the Composite Video-In Port on your monitor (*since in most monitors, the Composite Video-In connector is a RCA style, MallinCam provides a BNC to RCA adapter to facilitated that connection*).

Power

The Micro-EX or Micro-EX Wired requires 12V 1amp power either from an AC to DC converter or 12V DC power supply. Just connect power adapter into to Power In port on the back of the Micro-EX or into the RED Power In connecter on the end of the 2m cable on the Micro-EX Wired.

Connecting the Micro-EX to your Computer for Video

Requirements:

- Computer with video display software such as AMCAP.
- USB Video capture adapter such as MallinCam MCV.
- Mallincam dual power/video cable.
- Micro-EX AC to DC power adapter.
- Micro-EX camera.

Software Requirements:

You will need any software package that can display an image from your video capture device. Some suggestions are:

- AMCAP
- SharpCap
- SplitCam
- ManyCam
- WebCamMax

Each software has its pros and cons, depending upon what you require the software do. Using SplitCam, ManyCam, or WebCamMax will make it easier to broadcast your images on Night Skies Network (see section **Connecting the Night Skies Network (NSN)**) if that will be a direction you are thinking of taking.

Hardware Requirements

- A **USB Video Capture Device**, such as MallinCam's **MCV.** This device will allow the output from the Micro-EX (composite) to be captured and displayed by the software (see **Installing the MCV** in Appendix).

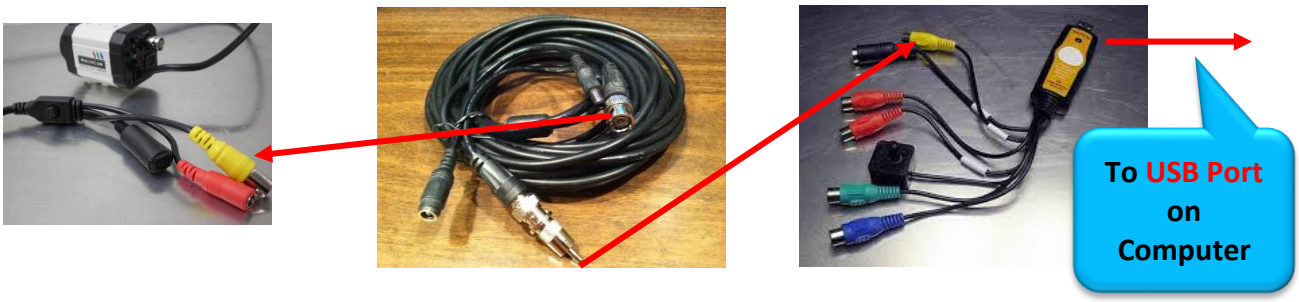
Attaching the Video Cable to Micro-EX

Now you attach the **Composite** cable from the back of the Micro-EX to the USB Video Capture Device (**MCV**) that you are using (see **Appendix D**, **Installing the MCV**) to capture the video signal from the Micro-EX.

Now all we need to do is start the video display software of your choice to display the image. Remember what ever software choice you made to display the image from the Micro Ex, it will have an option that allows you to choose the Video Capture Adapter's driver (**x2828** for MCV). Once you chosen the driver, you should now see an image of what the Micro EX is capturing.

Attaching the Video Cable to Micro-EX Wired Version

Now you attach the **Composite** cable from the end of the **Micro-EX Wired's** 2m cable (Yellow BNC) to the USB Video Capture Device (**MCV**) that you are using (see **Appendix D**, **Installing the MCV**) to capture the video signal from the Micro-EX.



Now all we need to do is start the video display software of your choice to display the image. Remember what ever software choice you made to display the image from the Micro Ex, it will have an option that allows you to choose the Video Capture Adapter's driver (**x2828** for MCV). Once you chosen the driver, you should now see an image of what the Micro EX is capturing.

Checking out the Micro-EX for the First Time

Now is the time to do a quick check of the Micro-EX to see if you can obtain a video signal. This walk through assumes you have a monitor with a Composite input capabilities (*or a Laptop with a Video Capture Device attached and configured along with Video Display Software*). Attach your Micro-EX to your telescope and keep the lens cover on your telescope and power up your Micro-EX (start your Video Display Software if using a Computer). It is best to check out your Micro-EE in the daytime, so you can more easily image an object.

Now depending upon the settings of the Micro-EX camera, your screen may be very colourful with specks dancing around the screen around the screen. Don't worry this is normal as we have not yet adjusted the settings.

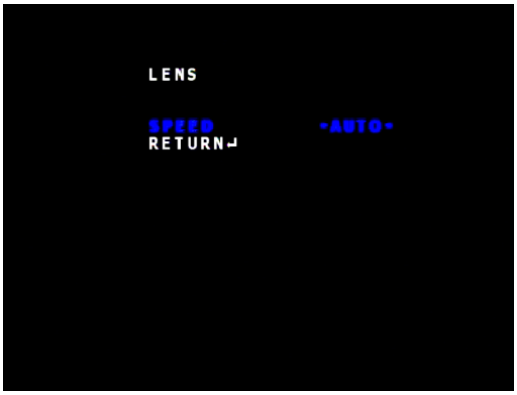
Press and release the **Centre Button** (⑤ *on the* ***Connection Diagram***) on the Back of the Micro-EX or at the end of the Remote if using Micro-Ex Wired. If everything is connected and powered correctly, you should see the following image with **EXPOSURE** Highlighted. The screen will still be dancing, and the **Highlighted Exposure symbol** may be blue and the other symbols hard to read, but you will have the Micro-Ex menu system displayed on your screen.

Note: If you have a Micro-EX Wired, then the buttons at the back of the camera are disabled, you need to use the Remote at the end of the 2m cable to control menu on the camera.

With the **EXPOSURE** selection highlighted (icon is brighter or blue), press the **Centre button** on the back of the camera to display the exposure settings. Match the settings on the right by using the **UP** and **DOWN buttons** to move from option to option, and the **LEFT** and **RIGHT buttons** to change it.

The highlighted option will indicate what you can adjust with the arrow keys (buttons). The arrow key choices will appear after the option's current vale. For example: in the last image, the **EXPOSURE** setting says **NORMAL**, and it has a **DOWN** arrow and a **RIGHT** arrow after it. This indicates you can change the **EXPOSURE** settings by either pressing the **CENTRE** button (which indicates there is a sub-menu in that setting that you can access by hitting the **CENTRE button**) or the **RIGHT button** (which changes the value of current feature). For our example on **EXPOSURE** if **NORMAL** was selected then pressing the **RIGHT button** will change its value to **BLC**, but now you will see that there is also a **LEFT** arrow option available to use. This way you can use the **LEFT button** to go back to the **NORMAL** setting or press the **RIGHT button** to go to the next value. If you pressed the **CENTRE button** when **NORMAL** was selected, the second menu will appear, but in this example just giving you the option to **RETURN** to the previous menu.

Now we want to set the **SPEED** to **AUTO** (this is just a simple setting, rather than playing with exposures). The **SPEED** setting is inside the **LENS** setting. Select **LENS** with the **UP** or **DOWN Buttons**, Press the **CENTRE Button** to select it, and you will be presented with the **LENS Menu**. Using the **LEFT** or **RIGHT Buttons**, change the speed to **AUTO** (or if you want to experiment, any other value of your choice that matches your current seeing). When set select the **RETURN** option with the **CENTRE Button** to go back to the **EXPOSURE Menu**.



Using the **DOWN** button, select the **EXIT** option and press the **CENTRE** button to close the **EXPOSURE** settings (the screen will now just have the ICONS). Using the **RIGHT** button, select the **DAY&NIGHT ICON**, and press the **CENTRE** button to accept it. In the **MODE** option select **DAY**. Now move to **EXIT** and press the **CENTRE** button to close the **DAY&NIGHT** screen.

Now, I would remove the Lens Cap from my telescope and go into the **ENHANCE** Menu and match the selections on the image to the left. You may want to experiment with the **GAMMA** value to produce an image that is bright enough for your equipment.

Finally, **EXIT** the **ENHANCE** menu and choose the **EXIT** Icon. Using the buttons, select **SAVE/EXIT** from the **EXIT** menu and press the **CENTRE** button. The camera will now save these settings as the default for the next time you use it. After the camera has saved these settings, it will then close the **ICON Menu**.

If you select the EXIT rather than the SAVE/EXIT, the ICON menu will shut down, but the Micro-EX will reset itself to the last saved settings.

These settings are just a starting point for your observations and you can adjust the settings to match both your equipment and seeing conditions. The next step in your learning should be to read the OSD MENU Chapter in this manual to get an understanding what the settings do and how they react to each other. This will save you hours of frustration when you are just adjusting the setting to try to improve your image.

If you do not press any of the buttons on the Micro-EX for about 3 minutes, the ICON menu will turn off, and the camera will return to the last SAVED settings.

3. Operating the Micro-EX

The MallinCam Micro-EX is an imaging camera whose capabilities are in the hands of the user. As you will discover, when you become more confident with the camera, that your images will be the result of the combination both artistic prowess and scientific skill. Both of these attributes will become enhanced as your journey progresses and suggestions and advice from fellow explorers sharpen your skills and enrich your adventure.

One of the first pieces of advice we can offer you is that every telescope system is different, the variety of optical sizes, and attached accessories combined with the ever changing seeing conditions makes it impossible to determine the precise setting for the Micro-EX to use with your telescope setup. What we can do is provide suggestions that will get you started in the right direction. We recommend that you experiment and tweak the settings that we offer to see what works best for you. Patience will be your best friend as you learn what the Micro-EX can do, and what you can adjust. Do not be afraid to visit Night Skies Network or the Mallincam Group on Yahoo and ask questions

Imaging Methods:

The Micro-EX provides three techniques of exposure control: **Fixed**, **Extended**, and **Stacked**.

Fixed: This technique allows you to set short exposure time from 1/60 of a second to 1/100000 of a second. This method of exposure allows the Micro-EX to image daytime objects such as the Sun, as well as bright nighttime objects such as the Moon and some planets.

> 1/60, 1/100, 1/120, 1/250, 1/500, 1/1000, 1/2000, 1/4000, 1/10000, 1/100000 of a second

When using **Fixed,** you can either leave the **EXPOSURE** settings in the Micro-EX in the **NORMAL** exposure mode for daytime objects (or even bright planets), or for objects such the Moon or Sun, set the exposure mode to either **WDR** (for the Moon) or **WLI** (for the Sun). You can also adjust the brightness with the **BRIGHTNESS** control

Extended: This mode allows you to do longer exposures from 1/32 to 17 seconds in fixed steps. This mode allows you to image those fainter planets, along with bright stars. But since the Micro-Ex has no cooling pushing the exposure can introduce noise.

> X2 (1/32s), X4 (1/16s), X8 (1/8s), X16 (1/4s), X32 (1/2s), X64 (1s), X128 (2.1s), X256 (4.2s), X512(8.4s), X1024(17s)

Stacking: This mode allows you perform longer exposures all the way up to 85 seconds. Unlike the **Fixed** or the **Extended** Mode, the Micro-EX needs to have **AGC** set to **LOW**. You will then have the option of telling the Micro-EX (by the **3D-DNR** setting) how many images you would like stacked to a maximum of 5. Therefore setting exposure to X1024 or 17 seconds, and when **3D-DNR** is set to 5, we will then see an image with 5x17s or 85 seconds worth of exposure.

Amp Glow and Warm Pixels

When you are using the Micro-EX in **Extended** or **Stacking** Mode two optical effects will occur due to the way CCD chips are made. The first is called **Amp Glow** and the second are **Warm Pixels**. CCD's operate using the property of silicon to convert light to electrons, but this also operates in reverse, silicon circuits can emit light when operating. At the corner of the CCD array is a high gain amplifier that converts electrons to a voltage that can be measured by the A/D converter. During the exposure this amplifier can emit enough light that it can be seen as a green glow in the corner of the frame in long exposures, this is **Amp Glow**.

The other effect called **Warm Pixels**, appear as green or purple, or even blue dots on your image (too small to be mistaken for stars). CCD Sensors collect

photons in microscopic wells, called pixels. CCD's do their magic by assigning electric charges to these photons. These charges are read as analog voltages. These voltages are sampled and quantized to make them into digital values. These digital values go through much more digital processing before we get to see them. Leakage currents are electric charges which leak into sensor wells. These excess electric charges increase the voltage at the well (pixel) and make it look brighter than it should.

Manufacturing variations will cause some pixels to have much more leakage current than others specifically as the CCD warms up. Even a few of these few pixels may permanently leak, these pixels are known as **Hot Pixels**, The Micro-EX has an internal feature (**DPC**) that you can activate that will help eliminate most of the Warm Pixels.

Since this is a property of the physics of the design of the CCD chip, there is no way to stop this from occurring on long exposures. What we can do though is minimize both the amp glow and warm pixel production.

- Keep the exposures as short as possible and use a low **AGC** value.

The Micro-EX has a feature in the **ENHANCE** Menu called **DPC** (**D**ead **P**ixel **C**ancelation) that will electronically try to remove Warm/Hot Pixels when it is activated.

Controlling the Micro-EX by Hand

You can control the Micro-EX manually in two ways:

1) Pushing the buttons on the back of the Micro-EX by using your fingers.
2) Using the **Micro_EX Wired** version which allows you to control those buttons, but without actually touching (*thus jiggling*) the Micro-EX.

These instructions will guide you in using the Micro-EX and obtaining an image using each of the 3 Methods of Imaging. Remember that you may need to adjust your particular settings to obtain the best image. Once you get the hang of changing the settings, it will be worth your time to peruse the Chapter **Understanding the Micro-EX Settings** to get a deeper comprehension how the adjustments affect your image.

The Moon (Fixed Exposure)
You have the telescope set-up (with it covered) and the Micro-EX attached to the eyepiece holder, the video cables are attached to a monitor, and power is connected to everything. You are feeling a bit of apprehension and excitement after all you have invested in an amazing scientific tool. So take a deep breath, and let's have some fun.

Step 1

With your telescope and Micro-EX connected and powered up (if you have the Micro-EX set to **Extended** or **Stacked** as the default, I would initially leave the lens cap on the telescope).

Using your finder scope, point your telescope at the Moon (it's hard to miss).

The Moon is always the best object to look at when learning how to use a new imaging device.

The recommended starting settings for imaging the Moon are displayed below. The instructions will walk you through setting these values into the Micro-EX.

EXPOSURE ICON

- EXPOSURE
  - **WDR**
  - WDR MODE: **ON**
  - WDR LEVEL: start at **10**
- SENSE UP: **OFF**
- AGC: **OFF**
- LENS
  - **ELECTRIC**
  - SPEED: start at **1/10000**
- BRIGHTNESS: start at **40**

COLOR ICON

- COLOR (RGB): **ATW (auto)**

DAY&NIGHT ICON

- **NIGHT** for black and white or DAY if you like color

EFFEC ICON

- SHARPNESS: **20**

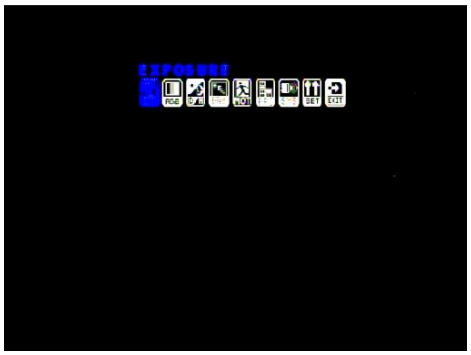
ENHANCE ICON

- GAMMA: **1**
- 3D-DNR: **0**
- DPC: **OFF**

So we will adjust the Micro-EX to match these settings. Remember these settings are just a starting point, you may need to tweak them for your telescope set up.

Step 2

With your Telescope still covered, **Press** the **Centre Button** on the back of the Micro-EX (or the **Centre Button** on the **Remote Wired Keypad**). The **< ICON MENU>** screen will appear on your monitors screen.



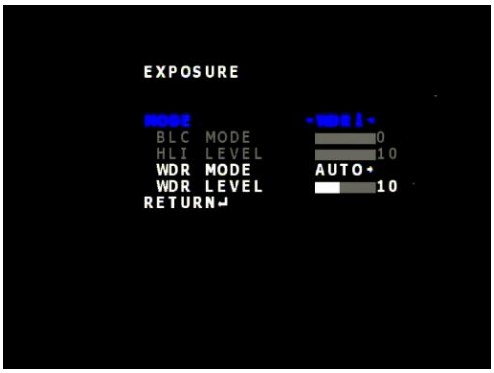
Step 3

With **EXPOSURE ICON** selected, Press the **Centre Button** to display the **EXPOSURE MENU**.

Step 4

With the **EXPOSURE Mode** selected (it may say **NORMAL**), Press the **RIGHT Button** enough times to set it to **WDR.**

Press the **CENTRE Button** to display the **WDR Menu**.



Press the **DOWN Button** to move to **WDR MODE**

- Press **RIGHT Button** to change its setting to **ON**

Press the **DOWN Button** to move to **WDR LEVEL**

- Press **LEFT or RIGHT Button** to set to **10**

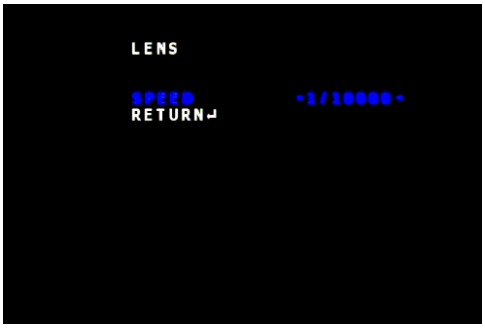
Press the **DOWN Button** to move to **RETURN**

- Press **CENTRE Button** to return to **EXPOSURE MENU**

Step 5 Using the **DOWN Button** select **SENSE UP** then using the **LEFT** or **RIGHT Button** ensure its setting is **OFF**

Step 6 Using the **DOWN Button** select **AGC** then using the **LEFT** or **RIGHT Button** ensure its setting is **OFF**

Step 7 From the **EXPOSURE MENU**, use the **DOWN Button** to select **LENS** option then press the **CENTRE Button** to display the **LENS MENU**



Step 8 Using the **RIGHT Button**, select a speed such as **1/10000.** Then move to the **RETURN** selection and press the **CENTRE Button** to return to **EXPOSURE MENU**.

Step 9 Use the **DOWN Button** to select the **BRIGHTNESS** feature and adjust this to your preferences using the **LEFT** or **RIGHT Buttons** (**40** is always a good place to start).

Depending upon your personal preferences we will now adjust the **DAY&NIGHT** Option on the Micro-EX.

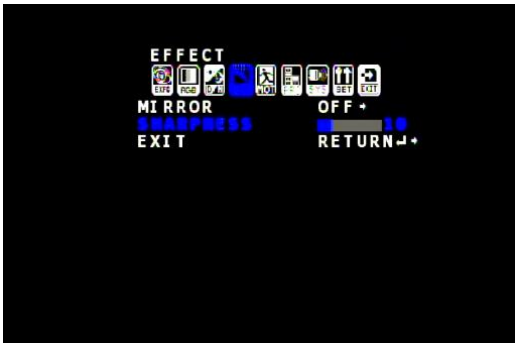
Step 10 While on the **EXPOSURE MENU**, select the **EXIT** choice at the bottom of the menu and press the **CENTRE Button** to close the **EXPOSURE MENU** and Return to the **ICON MENU**.

Step 11 Using the **RIGHT Button**, select the **DAY&NIGHT ICON** and press the **CENTRE Button** to display its menu.

Step 12 With the **MODE** choice selected, use the **RIGHT** or **LEFT Button** to select either **DAY** or **NIGHT** depending upon your preference. Now use the **DOWN Button** to select the **EXIT** choice and press the **CENTRE Button** to RETURN to the **ICON MENU**.

We will now set the sharpness value. I like to start at **10**, but you can adjust this to any value that best suits your system. The **SHARPNESS** feature is located in the **EFFECT ICON** Menu System.

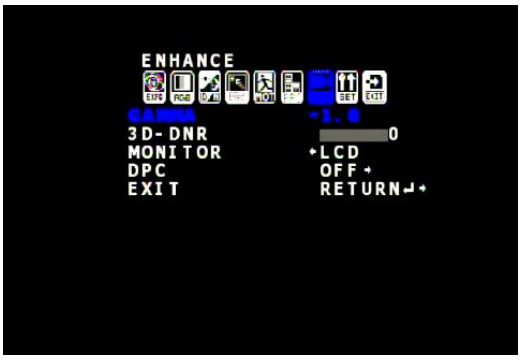
Step 13 Using the **LEFT** or **RIGHT Button**, select the **EFFECT ICON** and press the **CENTRE Button** to display the **EFFECT Menu**. Now using the **DOWN Button,** select the **SHARPNESS** choice and adjust to your preference using the **LEFT** or **RIGHT Buttons**. When satisfied, move to the **EXIT** choice and press the **CENTRE Button** to RETURN to the **ICON MENU**.



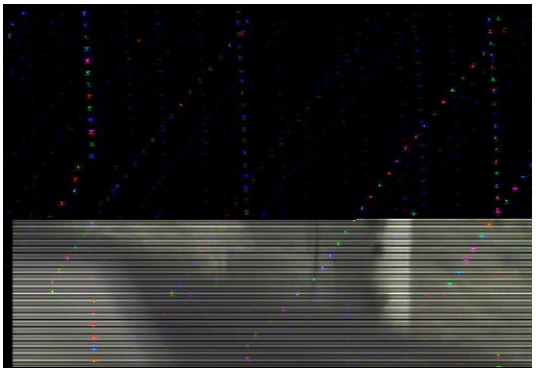
We will now ensure that the **GAMMA** is set to **1** (again your choice) and that **3D-DNR** is set to **0** and that **DPC** is **OFF**. All of these features are located in the **ENHANCE ICON MENU**.

Step 14

Using the **LEFT** or **RIGHT Button**, select the **ENHANCE ICON** and press the **CENTRE Button** to display the **ENHANCE Menu**. Now using the **Button,** set **GAMMA** to **1.0**, **3D-DRN** to **0**, and **DPC** to **OFF**. When satisfied, move to the **EXIT** choice and press the **CENTRE Button** to RETURN to the **ICON MENU**.



You should now have the starting settings to image the Moon. You must save these settings by going to the **EXIT ICON** and choosing **SAVE/EXIT**. The screen will jump a bit while the Micro-EX saves your settings, then the Menu system will shut down.



If you do not perform a **SAVE/EXIT** then if the Micro-EX is left alone for about 3 minutes, the Onscreen Menu will shut down and the camera will revert all of its settings to the last time a **SAVE/EXIT** was performed.

A Bright Star or Bright Deep Sky Object (Extended Exposure)
Now that you have success with imaging the Moon or bright planets, now is the time to jump to the next level, Bright Stars or Bright **D**eep **S**ky **O**bjects.

You have the telescope set-up (with it covered, just in case Micro-EX was left in the Stacking Mode) and the Micro-EX attached to the eyepiece holder, the video cables are attached to your monitor, and power is connected to everything. You are feeling a bit more confident with the equipment and using the buttons to select the setting options on the Micro-EX. Time for some more fun.

The recommended starting settings for imaging bright Deep Sky Objects are displayed below. The instructions will walk you through setting these values into the Micro-EX.

EXPOSURE ICON

- EXPOSURE
  - **NORMAL**
- SENSE UP: **OFF**
- AGC: **OFF**
- LENS
  - **ELECTRIC**
  - SPEED: **X128** (this is about 2.1 seconds)
- BRIGHTNESS: start at **40**

COLOR ICON

- COLOR (RGB): **ATW (auto)**

DAY&NIGHT ICON

- **DAY**

EFFEC ICON

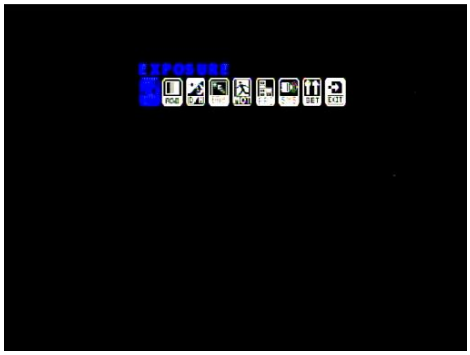
- SHARPNESS: **20**

ENHANCE ICON

- GAMMA: **1**
- 3D-DNR: **0**
- DPC: **OFF**

So we will adjust the Micro-EX to match these settings. Remember these settings are just a starting point, you may need to tweak them for your telescope set up.

Step 1 With your Telescope still covered, **Press** the **Centre Button** on the back of the Micro-EX (or the **Centre Button** on the **Remote Wired Keypad**). The **< ICON MENU>** screen will appear on your monitors screen.



Step 2 With **EXPOSURE ICON** selected, Press the **Centre Button** to display the **EXPOSURE MENU**.

Step 3 With the **EXPOSURE Mode** selected, Press the **RIGHT Button** enough times to set it to **NORMAL.**

Step 4 Using the **DOWN Button** select **SENSE UP** then using the **LEFT** or **RIGHT Button** ensure its setting is **OFF**

Step 5 Using the **DOWN Button** select **AGC** then using the **LEFT** or **RIGHT Button** ensure its setting is **OFF**

Step 6 From the **EXPOSURE MENU**, use the **DOWN Button** to select **LENS** option then press the **CENTRE Button** to display the **LENS MENU**

Step 7 Using the **RIGHT Button**, select the speed value **x128.** Then move to the **RETURN** selection and press the **CENTRE Button** to return to **EXPOSURE MENU**.

Step 8 Use the **DOWN Button** to select the **BRIGHTNESS** feature and adjust this to your preferences using the **LEFT** or **RIGHT Buttons** (**40** is always a good place to start).

Step 9 While on the **EXPOSURE MENU**, select the **EXIT** choice at the bottom of the menu and press the **CENTRE Button** to close the **EXPOSURE MENU** and Return to the **ICON MENU**.

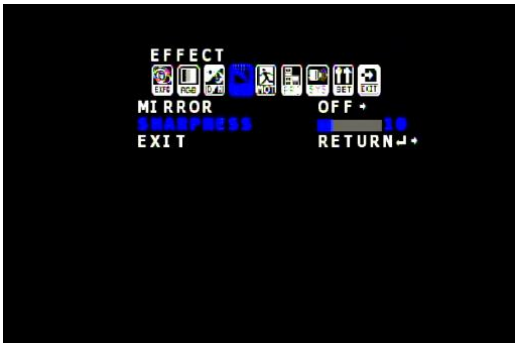
Step 10 Using the **RIGHT Button**, select the **DAY&NIGHT ICON** and press the **CENTRE Button** to display its menu.

Step 11 With the **MODE** choice selected, use the **RIGHT** or **LEFT Button** to select either **DAY**. Now use the **DOWN Button** to select the **EXIT** choice and press the **CENTRE Button** to RETURN to the **ICON MENU**.

We will now set the sharpness value. I like to start at **10**, but you can adjust this to any value that best suits your system. The **SHARPNESS** feature is located in the **EFFECT ICON** Menu System.

Step 12

Using the **LEFT** or **RIGHT Button**, select the **EFFECT ICON** and press the **CENTRE Button** to display the **EFFECT Menu**. Now using the **DOWN Button,** select the **SHARPNESS** choice and adjust to your preference using the **LEFT** or **RIGHT Buttons**. When satisfied, move to the **EXIT** choice and press the **CENTRE Button** to RETURN to the **ICON MENU**.



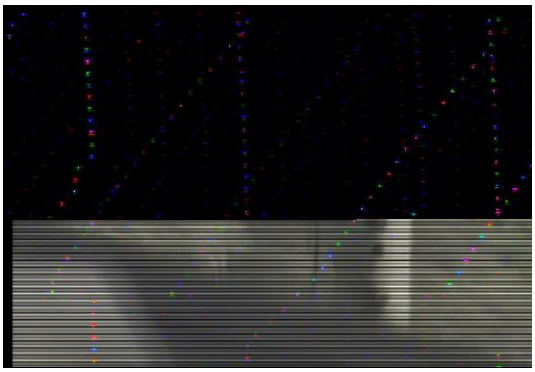
We will now ensure that the **GAMMA** is set to **1** (again your choice) and that **3D-DNR** is set to **0** and that **DPC** is **OFF**. All of these features are located in the **ENHANCE ICON MENU**.

Step 14

Using the **LEFT** or **RIGHT Button**, select the **ENHANCE ICON** and press the **CENTRE Button** to display the **ENHANCE Menu**. Now using the **Button,** set **GAMMA** to **1.0**, **3D-DRN** to **0**, and **DPC** to **OFF**. When satisfied, move to the **EXIT** choice and press the **CENTRE Button** to RETURN to the **ICON MENU**.

You should now have some starting settings to image your bright Deep Sky Object. You must save these settings by going to the **EXIT ICON** and choosing **SAVE/EXIT**.

The screen will jump a bit while the Micro-EX saves your settings, then the Menu system will shut down.



If you do not perform a **SAVE/EXIT** then if the Micro-EX is left alone for about 3 minutes, the Onscreen Menu will shut down and the camera will revert all of its settings to the last time a **SAVE/EXIT** was performed.

Deep Sky Objects (Stacking Method)
You have pushed the Micro-EX to 2.1 seconds or even higher seconds, but now you need to take the plunge and push the Micro-EX to the edge. We do this by having the camera internally stack the images before displaying them. It is possible to stack five 17 second images to perform an equivalent of 85 second exposure. We will walk through just stacking three 8.4 second exposures.

You have the telescope set-up and the Micro-EX attached to the eyepiece holder, the video cables are attached to your monitor, and power is connected to everything. You are feeling very confident with the equipment and using the buttons to select the setting options on the Micro-EX. Time for some more fun.

The recommended starting settings for imaging dim Deep Sky Objects are displayed below. The instructions will walk you through setting these values into the Micro-EX.

EXPOSURE ICON

- EXPOSURE
  - **NORMAL**
- SENSE UP: **OFF**
- AGC: **LOW**
- LENS
  - **ELECTRIC**
  - SPEED: **X512** (this is about 8.4 seconds)
- BRIGHTNESS: start at **40**

COLOR ICON

- COLOR (RGB): **ATW (auto)**

DAY&NIGHT ICON

- **DAY**

EFFEC ICON

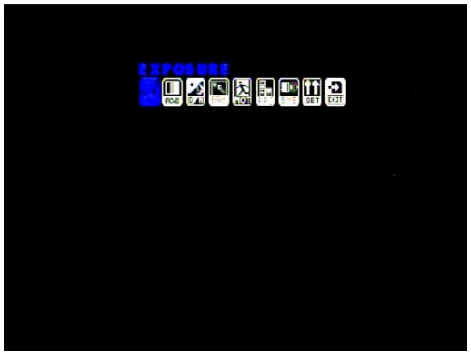
- SHARPNESS: **20**

ENHANCE ICON

- GAMMA: **1**
- 3D-DNR: **3**
- DPC: **AUTO**

So we will adjust the Micro-EX to match these settings. Remember these settings are just a starting point, you may need to tweak them for your telescope set up.

Step 1 With your Telescope still covered, **Press** the **Centre Button** on the back of the Micro-EX (or the **Centre Button** on the **Remote Wired Keypad**). The **< ICON MENU>** screen will appear on your monitors screen.

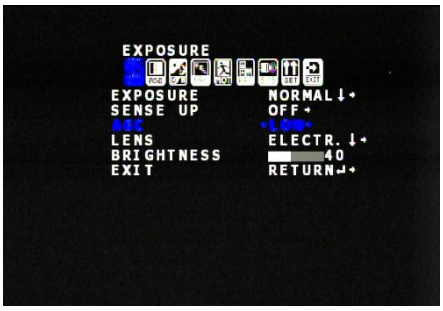


Step 2 With **EXPOSURE ICON** selected, Press the **Centre Button** to display the **EXPOSURE MENU**.

Step 3 With the **EXPOSURE Mode** selected, Press the **RIGHT Button** enough times to set it to **NORMAL.**

Step 4 Using the **DOWN Button** select **SENSE UP** then using the **LEFT** or **RIGHT Button** ensure its setting is **OFF**

Step 5 Using the **DOWN Button** select **AGC** then using the **LEFT** or **RIGHT Button** set its value to **LOW** (this is required for stacking).



Step 6 From the **EXPOSURE MENU**, use the **DOWN Button** to select **LENS** option then press the **CENTRE Button** to display the **LENS MENU**

Step 7 Using the **RIGHT Button**, select the speed value **x512.** Then move to the **RETURN** selection and press the **CENTRE Button** to return to **EXPOSURE MENU**.

Step 8 Use the **DOWN Button** to select the **BRIGHTNESS** feature and adjust this to your preferences using the **LEFT** or **RIGHT Buttons** (**40** is always a good place to start).

Step 9 While on the **EXPOSURE MENU**, select the **EXIT** choice at the bottom of the menu and press the **CENTRE Button** to close the **EXPOSURE MENU** and Return to the **ICON MENU**.

Step 10 Using the **RIGHT Button**, select the **DAY&NIGHT ICON** and press the **CENTRE Button** to display its menu.

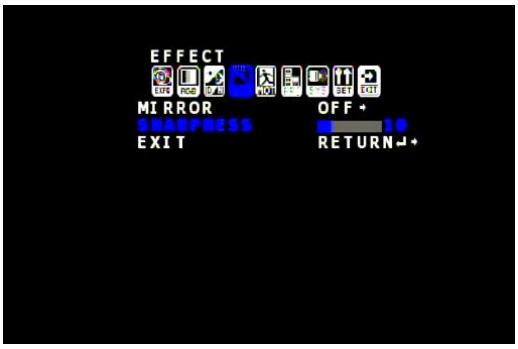
Step 11

With the **MODE** choice selected, use the **RIGHT** or **LEFT Button** to select either **DAY**. Now use the **DOWN Button** to select the **EXIT** choice and press the **CENTRE Button** to RETURN to the **ICON MENU**.

We will now set the sharpness value. I like to start at **10**, but you can adjust this to any value that best suits your system. The **SHARPNESS** feature is located in the **EFFECT ICON** Menu System.

Step 12

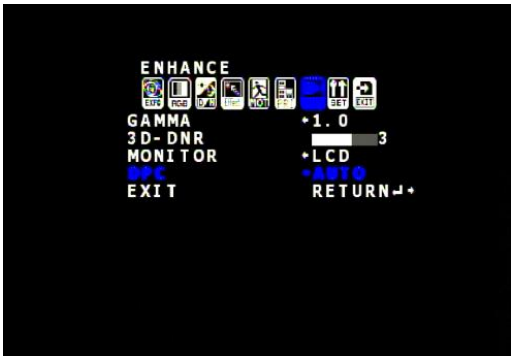
Using the **LEFT** or **RIGHT Button**, select the **EFFECT ICON** and press the **CENTRE Button** to display the **EFFECT Menu**. Now using the **DOWN Button,** select the **SHARPNESS** choice and adjust to your preference using the **LEFT** or **RIGHT Buttons**. When satisfied, move to the **EXIT** choice and press the **CENTRE Button** to RETURN to the **ICON MENU**.



We will now ensure that the **GAMMA** is set to **1** (again your choice) and that **3D-DNR** is set to **3** (to stack 3 images) and that **DPC** is **OFF**. All of these features are located in the **ENHANCE ICON MENU**.

Step 14

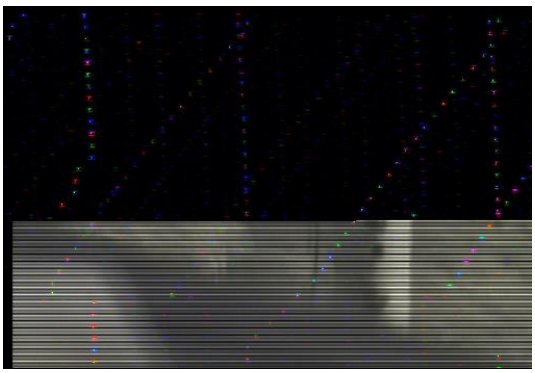
Using the **LEFT** or **RIGHT Button**, select the **ENHANCE ICON** and press the **CENTRE Button** to display the **ENHANCE Menu**. Now using the **Button,** set **GAMMA** to **1.0**, **3D-DRN** to **3**, and **DPC** to **OFF**. When satisfied, move to the **EXIT** choice and press the **CENTRE Button** to RETURN to the **ICON MENU**.



You should now have some starting settings to image your dim Deep Sky Object. You will see noise in your image if you start pushing the Micro-EX too much. Play with your settings to provide the best image possible.

You must save these settings by going to the **EXIT ICON** and choosing **SAVE/EXIT**.

The screen will jump a bit while the Micro-EX saves your settings, then the Menu system will shut down.



If you do not perform a **SAVE/EXIT** then if the Micro-EX is left alone for about 3 minutes, the Onscreen Menu will shut down and the camera will revert all of its settings to the last time a **SAVE/EXIT** was performed.

Controlling Micro-EX by Computer

Requirements:

- Computer with video display software such as AMCAP.
- Software to Control Micro-EX such as Stephane Lalonde's Micro-EX MControlMicro software.
- USB Video capture adapter such as MallinCam MCV.
- Mallincam Micro-EX to USB cable.
- Mallincam dual power/video cable.
- Micro-EX AC to DC power adapter.
- Micro-EX camera.

Harware Requirements

A **USB to RS232 Adapter** that attaches to **MallinCam's Optional Micro-EX cable**. This combination allows software to communicate from the computer to the Micro-EX.

Software Requirements:

The current software packages are:

Free:

- MallinCam Control Micro-EX by Stephan Lalonde that allows you to access the back buttons from the camera, but through software.

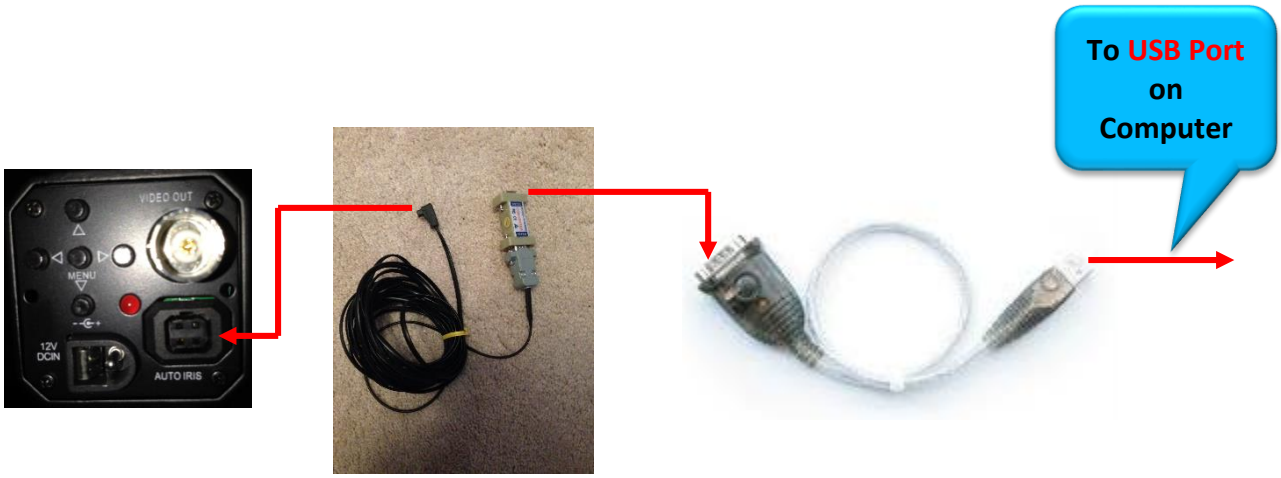
Paid:

- Astrolive by Kyle Goodwin at Astro Precision

Each software has its pros and cons, depending upon what you require the software do, but since most will use Stephane's Control Micro EX, I will demonstrate how to install it and use this piece of software.

Attaching the RS485 Cable

Once the USB adapter is installed and the drivers loaded (see **Appendix D**, **Installing RS485 Communications**) and the MallinCam RS485 cable is attached, it is time to connect it to the Micro-EX. Locate the small guide notch on both the cable and the AUTO-IRIS Port on the Micro-EX (will be on lower right when looking at the back of the camera). Align the notches and plug in the RS485 cable. The cable end will also be pointing down. The fit will be snug so a little pressure will be required to properly seat the cable into the Micro-EX. You will notice that will all of the cables connected, the back of the Micro-EX gets a little busy.



Using MControlMicro Software to control the Micro-EX

This assumes you have connected the Micro-EX to your Serial or USB to Serial port on your computer (and you know the **COMM** number assigned to it) and are ready to control the Micro-EX from the computer rather than the buttons on the back of the Micro-EX. You have set the **COMM ID** (from the **SYSTEM** Menu on the Micro-EX) to **1** as the default.

Installing

Visit www.Mallincam.net and select Stephane Lalonde's Mallincam Control software for Micro-EX from the Software Downloads of the Support Tab and download the software.

This is a RAR fie, so you will need some free software that will un-compress the files. A great free piece of software is WinRAR.

Decompress Stephane's software using your RAR software of choice. You will now have a file folder named **mcontrolmicro**. Inside this folder is **MControlMicro**, the software to control the Micro-Ex. Place this folder in a location that is easy to find.

Starting Micro-EX Software

Step 1 **Double Click** on the file **MControlMicro**

Accept any security warnings that may appear in your operating system.

The Stephane's software will open up a window on the computer screen.

You need to prepare the Micro-EX so that it can be controlled by Stephane's software. **Ensure** that in the COMM ID is set to 1, BAUDRATE is set to 9600 and then DO A **SAVE/EXIT** to make this the default.

Step 2

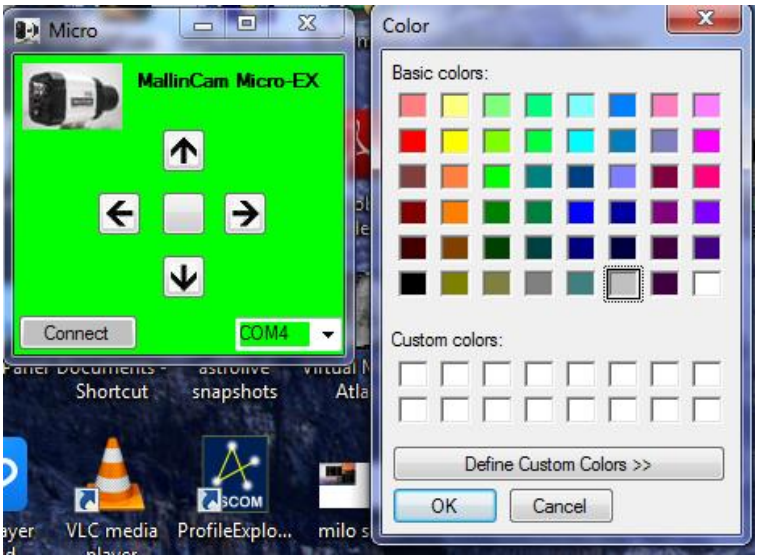
On Stephane's software select the **COM** port number so that it matches the Serial Adapter **COM** number assigned by the computer.

Step 3

Click on **Connect** to start the Software Controlling the Micro-EX

You can now click on the software buttons and the Micro-EX will react as if you press on the buttons at the back of the Camera

Note: If you click on the Picture of the Micro-EX camera, the software will pop-up a color scheme for you to use.



Connecting to Night Skies Network (NSN)

Introduction

I found that when I first started connecting to NSN, things started happening too fast for me to keep track of everything at once. So, pre-planning was the most the most crucial step for me. I found that by doing test runs in the comfort of my house allowed me to develop my techniques that work for the equipment and software that I use. Below are the results and steps that I use to broadcast on NSN, feel free to follow them and/or made modification as you deem as necessary.

Note

Computer real-estate will be your nemesis. So, depending upon the size of the monitor (laptop), then number of screens that you are using, then number of software programs that using are simultaneously are using, will dictate how you will manage your windows. I will describe how I have organized my windows under a variety of situations (1 computer, 1 computer with 2 monitors, which software packages am I using, and what am I trying to do this session). Remember, it's all about having fun, and ***time*** and ***patience*** are your best friends (not to mention all the guys and gals, and the Yahoo – MallinCam site :

http://tech.groups.yahoo.com/group/mallincam/messages

One of the most important decisions you will need to make with broadcasting the image of the MICRO-EX is what Video capture software are you going to use. Some simple suggestions:

You can have NSN grab the image directly off your Video Capture Device (MCV), but I find it more convenient to either use a Video Capture Software such as AMCAP, or SMARTCAP to display my image and then capture my screen by using Splitcam, Manycam, or WebCamMax. Even better Splitcam, Manycam, or WebCamMax can both display and pass along the image to NSN without the need of a Video Capture Software. All three have about the same features, some of these have versions that will cost you, but all have a version that is free (reduced functions, advertisements, etc…). My current program of choice is Splitcam (I can live with the Advertisements, but it has some amazing extras such as the ability to change Video Input from Svideo to composite, a must if you use MallinCam's MCV device with a variety of cameras.

Step 1

Plug in the MICRO-EX camera into a USB Port (MCV) on your computer.

Note

Always use the same port for your connected devices. I even mark on my laptop which USB port is for which device. I even use a specific **USB** port for my Video input devices (***MCV, MICRO-EX, Dazzle***), and a specific port for by ***RS232***, ***RS485*** devices. For example if you only have 2 ports, then 1 port is for video input (***MCV***), and the other port is for ***RS485*** control.

Step 2

Start Manycam/Splitcam/WebcamMax

Note

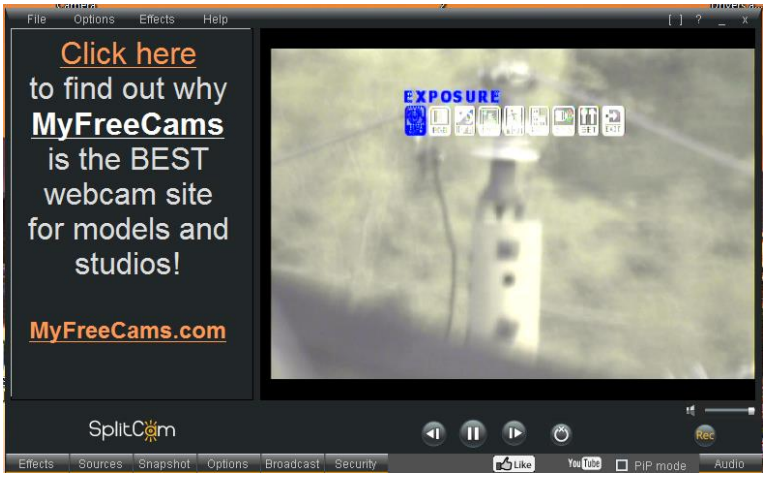
Size the Manycam/Splitcam/WebcamMax window so that you will have room for your Browser to open. If you have a dual monitor system you can slide Manycam/Splitcam/WebcamMax window to the second monitor.

Step 3

Have Manycam/ Splitcam/WebcamMax Choose your Video Driver as the Source

Note

Once connected, you should have the image of what the Micro-EX is looking at inside the Window of the software. If you are using a third party Video Display Software then have Manycam / Splitcam / WebcamMax choose Desktop Capture as the source.



Step 4

Adjust the Resolution and frames/second (fps) value on Manycam/Splitcam/WebcamMax

Note

This will be trial and error; it all depends upon resolution, bandwidth, and what over members on NSN experience from your broadcasted image. You will end up adjusting both on the Manycam / Splitcam /WebcamMax side as well and on the NSN side to get the best image. For me I start at 800x600 and NSN at 800x600.

Step 5

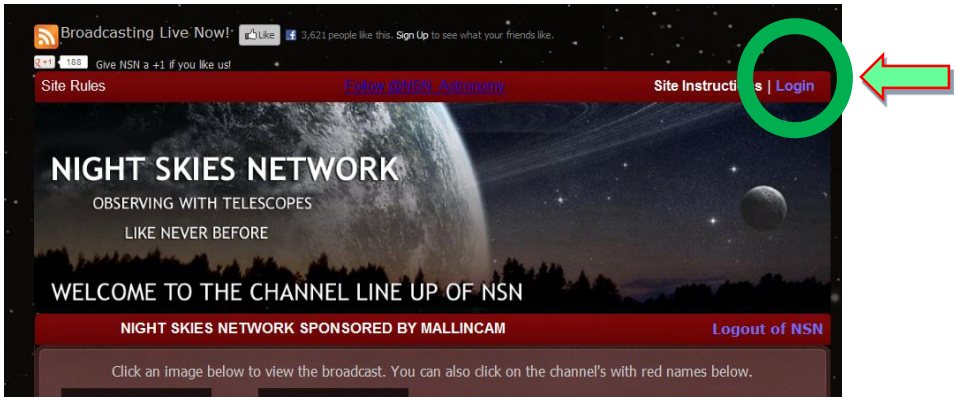
Start your Web Browser of Choice

You may have to play with a number of Browsers to see which one works well with your particular computer setup. I have had success with 3 browsers: ***Chrome***, ***Internet Explorer***, and ***Maxthon***. My current favourite browser to use for NSN broadcast is ***Chrome***.

Step 6

Log into Night Skies Network (NSN)

Have your Web Brower go to the location: http://www.nightskiesnetwork.com/ . Locate and click on the ***BROADCASTERS AND MEMBERS SIGN IN*** button. The next ***Login*** screen will ask you to enter your ***username*** and ***password***. You will next be presented with the ***Channel Line Up*** screen for Night Skies network. Click on the ***Login*** selection on the upper right hand side of the screen.

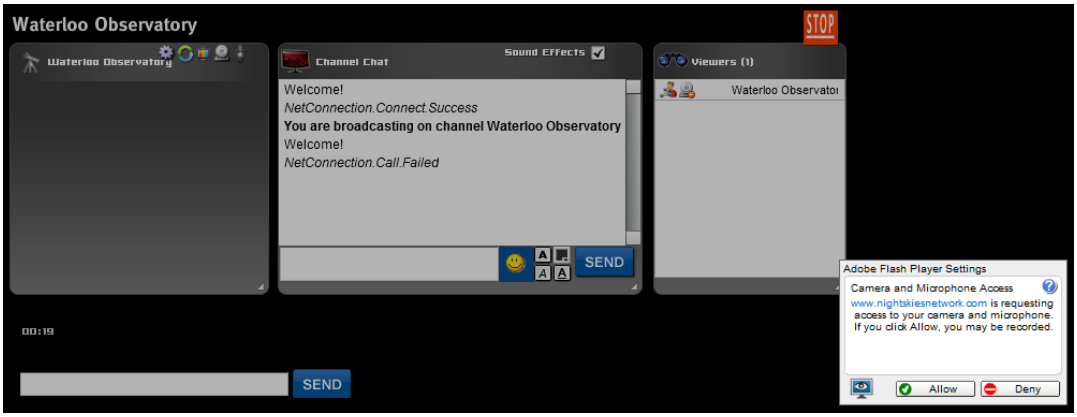

Broadcasting Live Now!
Like
3,621 people like this. Sign Up to see what your friends like.
Give NSN a +1 if you like us!
Site Rules
Site Instructi s | Login
NIGHT SKIES NETWORK
OBSERVING WITH TELESCOPES
LIKE NEVER BEFORE
WELCOME TO THE CHANNEL LINE UP OF NSN
NIGHT SKIES NETWORK SPONSORED BY MALLINCAM
Logout of NSN
Click an image below to view the broadcast. You can also click on the channel's with red names below.

You will be presented with the ***Channel Launch Sign In*** screen for NSN. Again enter your ***Username*** and ***Password*** and click on ***Publish Channel*** button.

Step 7

Allow Adobe Flash to use your Manycam/Splitcam/WebcamMax

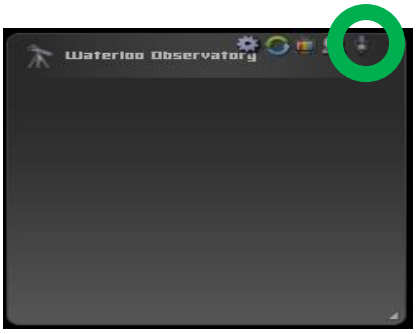
The ***Adobe Flash Player Settings*** window will pop up on your screen asking you for permission to use your camera and your microphone. Select ***Allow***.



Step 8

Turn off your Microphone

Until you have your microphone figured out, it is best to initially turn it off. If you do not, the viewers on NSN may hear a loud buzzing (feedback noise). Later on we will look at using the microphone, but until then I recommend ***CLICKING*** on the little ***microphone symbol*** on the upper right corner of the NSN video display window to disable the microphone.



Step 9

Set a message for the NSN observers

It is a good idea to display a message above the NSN display window, so that the other NSN views understand what you are doing. When initially setting up (which usually takes longer when you are learning), I usually type the message "***Setting Up the Camera***" then ***CLICK*** on the ***SEND*** button to have it displayed.

Note

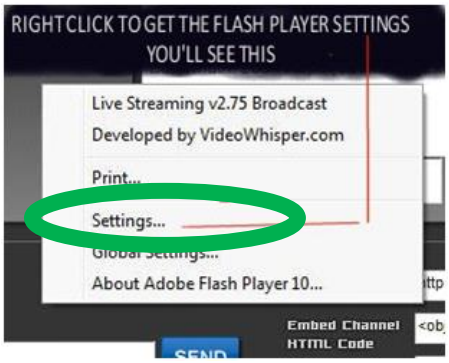
When you are us and running and everything is working as it should, you will change the message to indicate, what telescope, mount, and camera you are using. For that is the most frequently asked question from the NSN viewers.

Step 10

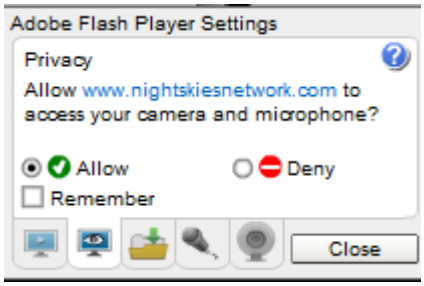
Select the Camera

Now is the time to activate the camera, or in our case have NSN driver point to our Manycam/Splitcam/WebcamMax output or the Video Adapter Driver is you are not using Manycam/Splitcam/WebcamMax.

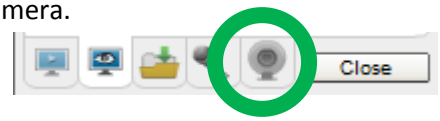
- ***RIGHT CLICK*** inside the NSN Video window to bring up a ***Settings Window***



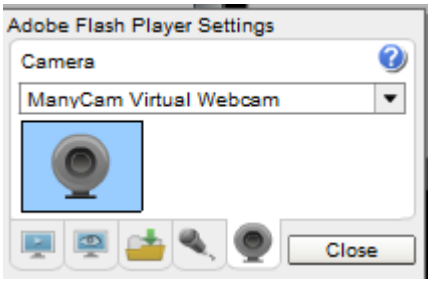
- ***CLICK*** on the ***Settings*** choice and you will be presented with the ***Adobe Flash Player Settings Window.***



- ***CLICK*** on the ***Camera Icon*** and you will be presented with a ***pull down menu*** to select your camera.



- ***CLICK*** on the ***Pull Down*** list to select your camera of choice.



- ***CLICK*** on ***CLOSE*** to Continue.

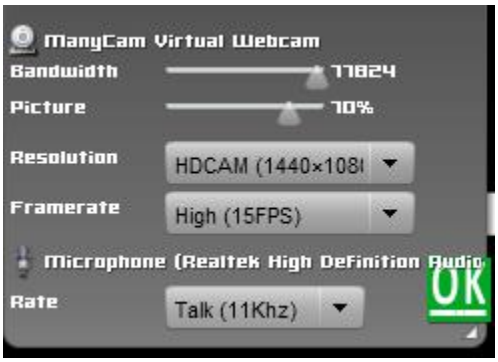
NSN will remember what camera you chose from the last visit. So usually you only have to go through this process whenever you want to change what camera device you would like the ***NSN flash driver*** to use.

Step 11 ***Choose your Camera Settings***

We will now select the settings for our camera. We have the option of changing: The ***Bandwidth***, ***Picture***, ***Resolution***, ***Framerate***, and even the ***microphone rate*** (when you

are ready). The changes will **not be activated** until you ***CLICK*** on the Green ***OK*** symbol in the window.

- ***LEFT CLICK*** inside the NSN video Window to bring up the ***Camera Settings Window***.



- ***Use the sliders*** for ***Band Width*** and ***Picture*** values. I usually have both of my sliders way on the right. Over time you will find the sweet spot for your system.

- Select your ***Resolution*** from the ***Pull Down Menu***. Start at 800x600 and move up from there. Play with these to see what settings the NSN viewers say is the best.

- Select your ***Frame Rate***. From its ***Pull Down Menu***. I usually leave it at 15 fps, but I have used 30 fps at times. Again trial and error for your system.

- ***CLICK*** on the green ***OK*** symbol to accept these settings

That's it, you are done. If everything is working well and the Window's gods are in a good mood, you should be broadcasting whatever object the MICRO-EX is capturing. You should now enter another Message and ***SEND*** it out to indicate what system you are using and what object you are viewing.

Note

There is a time delay on what you say (if you have you microphone activated) and do on your computer as compared to what others see (and hear) on the NSN broadcast.

Note

You will freeze (and I don't mean like what Chris does when he broadcasts in winter till 3am), I mean from time to time your NSN connection will freeze for no apparent reason. It happens to us all. When this happens, you can simply terminate the Web browser program (Ctrl –Alt-Del). Then restart your browser and Log back into NSN. This usual is a very quick process. But, sometime we all have to

restart our computer (this takes longer for we need to power down hardware and software) and reactivate everything before login back in. Don't worry, the NSN viewers sense what is happening and will keep the conversations going while waiting for you to come back on.

Don't be afraid to ask for advice by typing in on the Video chat window, as we are all learning and are willing to assist whenever we can.

When ready, try activating the microphone (click on the microphone symbol). Other will let you know if they can hear you, or if there is noise. Remember there are settings for the microphone in the camera settings window.

I have become hooked on ***Splitcam***. With my dual monitor system I have Splitcam grab my Video device (***USB 2828x Device***) directly. Splitcam can adjust brightness, contrast, etc. I can also call up the ***USB 2828x Device*** control panel (located in ***File/Video settings***) which gives you some more control of the MCV's image output or by using the Options Tab thus allowing you to change the brightness contrast, sharpness over and above what the Micro-EX camera does. Since I place Splitcam on its own monitor (the second monitor), I can make it full screen to see all the detail, while my fist monitor has the NSN connection screen with its preview and chat window.

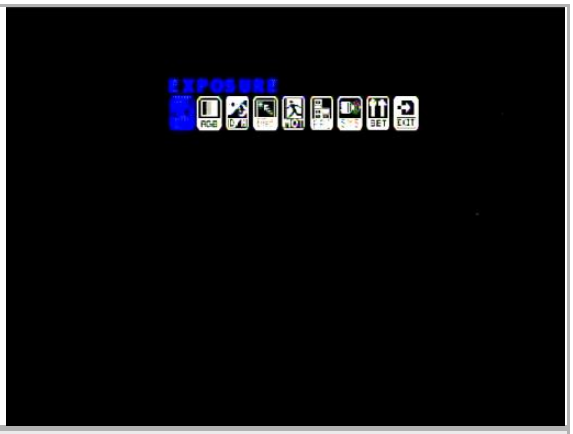
When you are finished with your session, you simply say your good nights to the crowd of NSN viewers to let them know that your session is ending. ***CLICK*** on the red ***STOP*** button on your NSN Window and NSN will shut down your channel and you can power down your system and call it an evening (It won't force the NSN viewers off the channel and some viewers will continue chatting long after you have gone to bed).

4. Appendix

Appendix A – On Screen Display (OSD) Menu

MENU

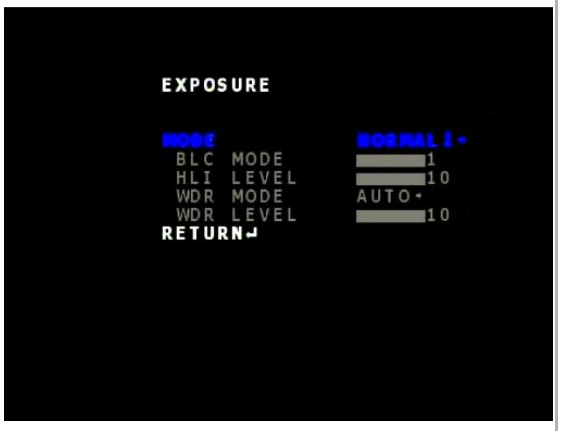
This is the main menu for the Micro-EX. It is from here that you select which setting you would like to adjust. Menu selections include: EXPOSURE, COLOR, DAY&NIGHT, EFFECT, MOTION, PRIVACY, ENHANCE, SYSTEM, and EXIT



EXPOSURE MAIN

This setting is used to adjust all aspects of the exposure. Settings include: EXPOSURE TYPE, SENSE UP, AGC, LENS, and BRIGHTNESS. It is in this Menu that you will make most of your changes.

EXPOSURE

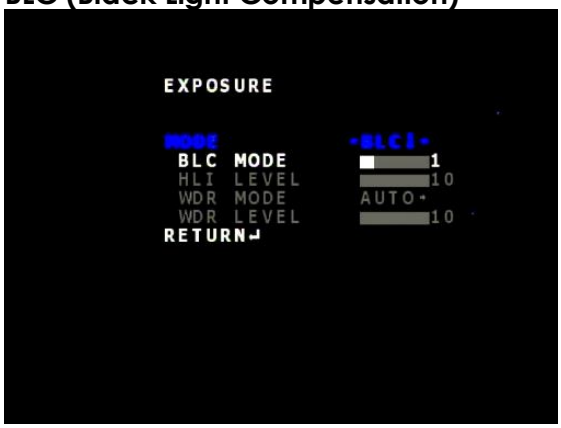


NORMAL

You will use this mode for most of your viewing. It doesn't provide you any options to make adjustments.

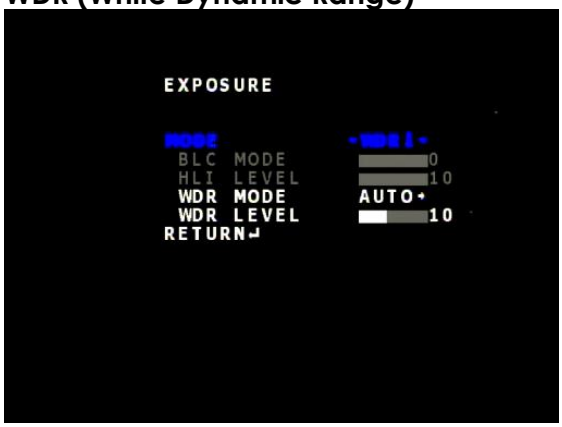
This control offers you 4 exposure modes: NORMAL, BLC, WDR, and HLI.

BLC (Black Light Compensation)



This Exposure Mode is usually not used in astronomical imaging. BLC does offer the user adjustment Mode settings of 0, 1, 2, and 4.

WDR (White Dynamic Range)



This mode provides you with an opportunity enhance objects with large dynamic range such as the Moon.

When the WDR MODE is set to AUTO you can manually adjust the WDR LEVEL to bring out the best of the displayed image.

When WDR is set to ON, the Micro-EX fixes the value.

HLI (Highlight)

This mode is ideal for viewing the Sun. You can adjust the HLI LEVEL (from 0 to 40) to produce a chronograph that will obscure the Solar Disk, and thus enhance any visible prominences.

SENSE UP

This Setting allows you to adjust the exposure of the Micro-EX (to a maximum of 17 seconds) by utilizing the HIGH value of the AGC setting. This setting is not recommended for astronomical viewing since it will produce an intense amp glow. The Micro_EX provides an alternate setting (LENS) to adjust the exposure with minimal amp glow.

Set SENSE UP to OFF

X2 = 1/32 second exposure
X4 = 1/16 second exposure
X8 = 1/8 second exposure
X16 = 1/4 second exposure
X32 = 1/2 second exposure
X64 = 1 second exposure
X128 = 2.1second exposure
X256 = 4.2 second exposure
X512 = 8.4 second exposure
X1024 = 17 second exposure

AGC

AGC or **A**uto **G**ain **C**ontrol instructs the Micro-EX how much amplifier gain you would like to apply to the signal coming out of the CCD chip (it is equivalent to cranking up the ISO setting on your photographic camera.

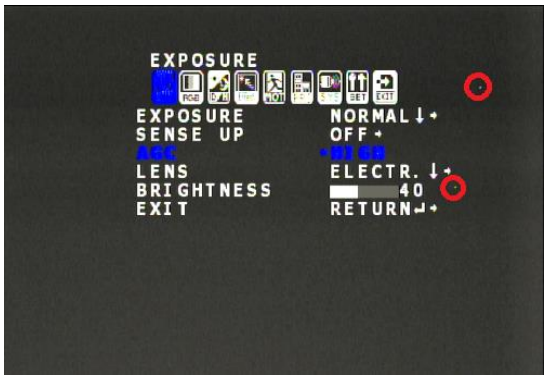
AGC has 4 settings:

- **OFF**
- **LOW**
- **MEDIUM**
- **HIGH**

For Normal viewing of objects set **AGC** to OFF.

If you need to have the Micro-EX perform on camera stacking (**3D-DNR**) then set **AGC** to **LOW**

When **AGC** is set to **HIGH**, you may notice back ground noise as well as warm pixels showing up.



LENS

LENS option provides a way of setting **SPEED** values (exposure times) on the Micro-EX.

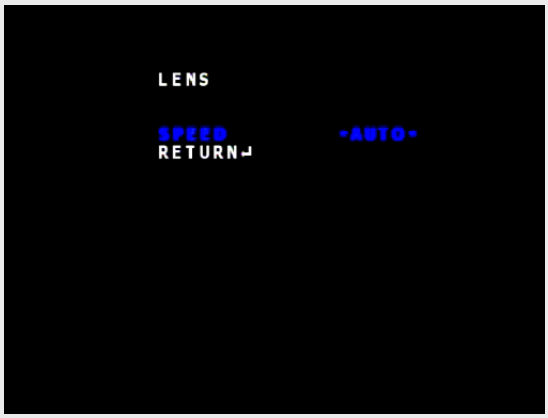
It provides two options:

- **Electric**
- **DC Iris**

Since Rock has converted the **Auto Iris Port** to a **RS485 Port,** you will never you're the **DC Iris** setting.

The **ELECTRI**C setting will allow you to adjust your exposure time.

The **ELECTRIC** setting Menu will provide access to the **SPEED** (exposure) settings for the Micro-EX.



The available SPEED settings are:

AUTO – makes best guess
1/100000 second exposure
1/10000 second exposure
1/4000 second exposure
1/2000 second exposure
1/1000 second exposure
1/500 second exposure
1/250 second exposure
1/120 second exposure
1/100 second exposure
1/60 second exposure
X2 = 1/32 second exposure
X4 = 1/16 second exposure
X8 = 1/8 second exposure
X16 = 1/4 second exposure
X32 = 1/2 second exposure
X64 = 1 second exposure
X128 = 2.1second exposure
X256 = 4.2 second exposure
X512 = 8.4 second exposure
X1024 = 17 second exposure

BRIGHTNESS

This feature allows you to adjust the Brightness of the image. The sliding bar allows you set the brightness value from a low of **0** to a high of **99**. The default brightness value is set to **40**.

EXIT

All **ICON MENU** sections will provide an **EXIT** option. With the **EXIT** feature also providing you 3 choices:

- **RETURN (to previous menu)**
- **EXIT**
- **SAVE/EXIT**

There also is an **EXIT ICON** that allows you to turn **OFF** the Menu System.

EXIT – Closes the Menu system without saving any changes to the settings you may have adjusted.

SAVE/EXIT – Saves the changes and closes the Menu System

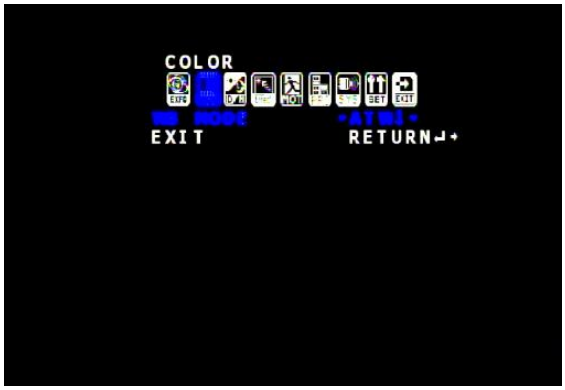
INITIALIZE – Will reset the Micro-EX to factory defaults. This fill require you to set all appropriate setting back you your preferences.

COLOR

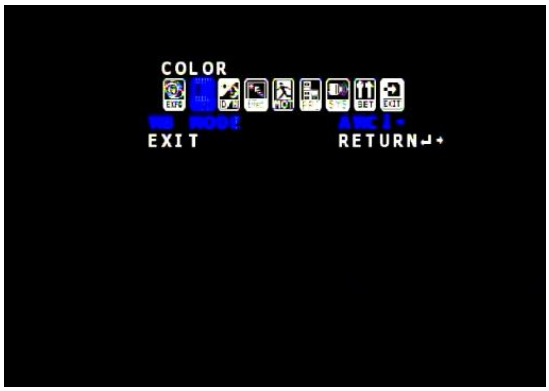
The **COLOR Menu** allows you to adjust the color of your mage (assuming you have set **DAY&NIGHT** to **DAY** which activates color on the Micro-EX).

The Color Menu provides you 4 options for you to set:

- **AWC**
- **ATW**
- **MANUAL**
- **PUSH**

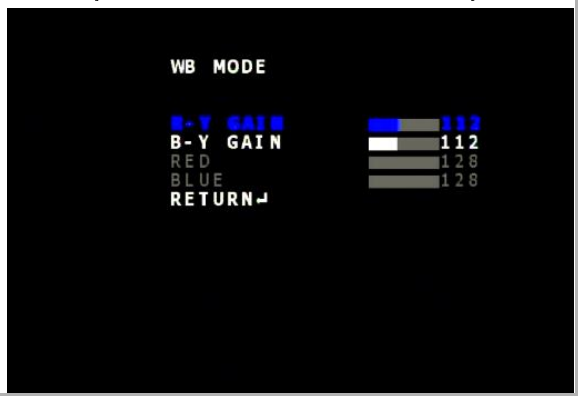


AWC (Auto White Compensation)



When activated, the **AWC** function detects white in the captured image and adjusts the color/white balance accordingly. You will be able to adjust the **R-Y Gain** (Red Tint) or the **B-Y Gain** (Blue Tint).

ATW (Auto Trace White Balance)

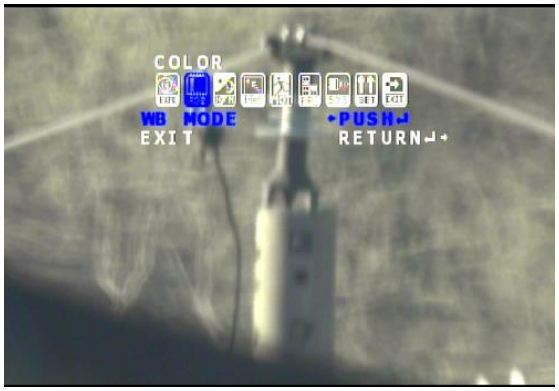


A specific form of **AWC**, **ATW** continually tracks and adjusts the white balance, making it suitable for use in cameras in which the image content and lighting are subject to changes. You will be able to adjust the **R-Y Gain** (Red Tint) or the **B-Y Gain** (Blue Tint).

MANUAL

This mode allows you to adjust the **RED** and **BLUE Saturation** levels in your image. You will notice the Color Balance changing when you adjust the **RED** and **BLUE** Options.

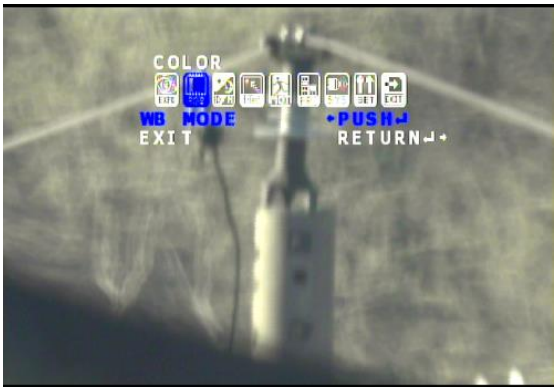
PUSH



Once pressed, this lets the Micro-EX measure the current Color Balance and adjusts it to what it believes is the best values.

Before activating **PUSH**

After activating **PUSH**



DAY&NIGHT

The DAY&NIGHT feature allows the camera to present the images in either Color (Day) or Black and White (Night).

The AUTO option is also available but it and its adjustments really don't have a role in astro-imaging.

DAY

This setting displays the images (and even a blue menu selection indicator) in color. You can adjust the color images with the settings inside the **COLOR MENU**.

NIGHT

This setting will now display the images in Black and White. When in **NIGHT** Mode, you also have the ability to set the **BURST** to either **ON** or **OFF**. I find **ON** is easier to read the menus but on bright objects you may get some flare as the camera pushes the values.

AUTO

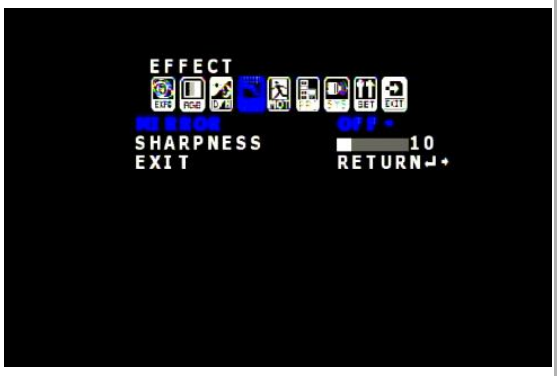
This allows the Micro-EX to determine if it should go into **DAY** or **NIGHT** Mode depending upon the image. This Mode does allow you some settings to adjust such as how long it should wait before shifting modes and what are the intensity trigger points it should use to determine if it should shift from **DAY** to **NIGHT**.

Day->Night: The value ranges from 0 to 255. The day mode switches to the night mode when the light condition reaches to the value you select.

Night->Day: The value ranges from 0 to 255. The night mode switches to the day mode when the light condition reaches to the value you select

Since the Micro-EX doesn't have a **CDS** (a photocell) sensor, the **CDS –START** and **CDS-END** options are disabled.

EFFECT



This feature effects how the image is presented on the screen. It provides two options for your to adjust:

- **MIRROR**
- **SHARPNESS**

The **MIRROR** option allows you to rotate or flip the screen image either horizontally or vertically.

The **SHARPNESS** option allows to make the image softer (low value) or sharper

MIRROR

The Mirror feature provides you with 4 settings:

- **OFF**
- **HOR**
- **VERT**
- **ROTATE**

OFF Image:

Image is in its normal orientation.

(high value). Note: that a high **SHARPNESS** value can even sharpen the noise and thus bring out artifacts and halos around brighter stars. A good value to start with is **20**, but experiment with this feature to find the best value that balances the detail of the image with the artifacts produced.

The **SHARPNESS** option ranges from **0** to **49**.

HOR Image

Notice how the image is flipped about the Vertical Axis.

VER Image

Notice how the image is flipped about the Horizontal Axis.

ROTATE Image

Notice how the image is both flipped about the Horizontal Axis and the Vertical Axis.

MOTION

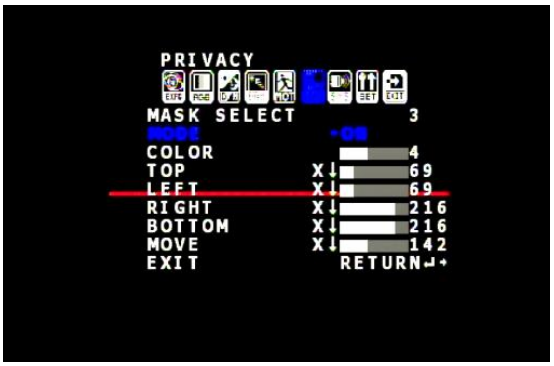
This feature, Motion Detect, is not used in astro-imaging.

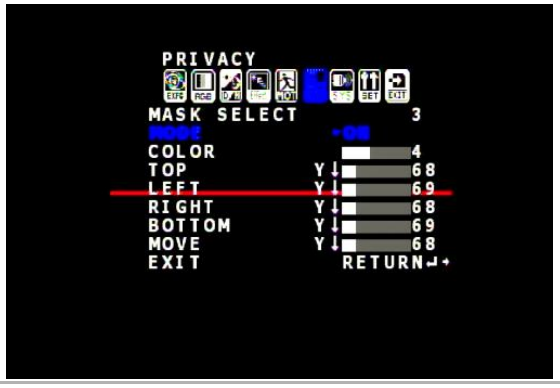
It may be fun to see how the alarm and auto zoom may work when looking at stellar objects. Nothing to lose, someone may actually find an application for this feature.

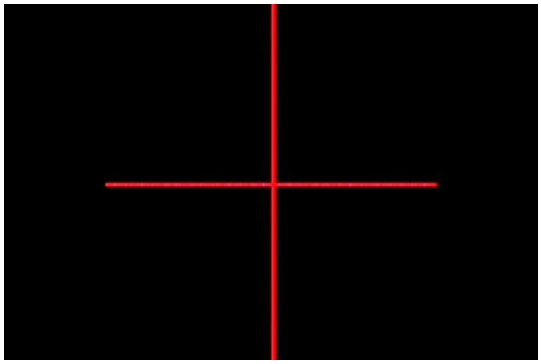
PRIVACY

This feature allows you to create masks on the screen of various colors, but it takes a while to create masks that can be useful. The Left panel will give the mask settings that will create a simple cross hair on the screen. Experimenting with the values may produce a better cross bar than the one I created below.

Settings for the **X** and **Y** values for the first of the two Masks required for a cross bar.

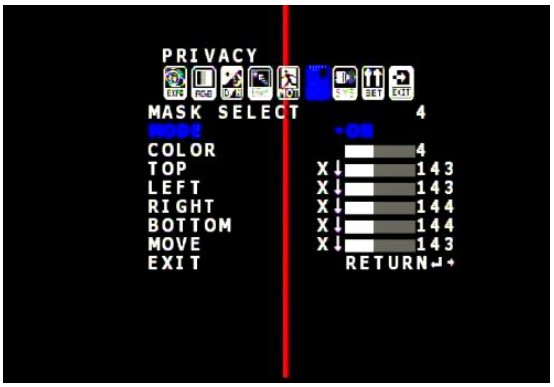






The masks have both an **X** and **Y** value that can be accessed by simply pressing the Centre Button when on the **TOP**, **LEFT**, **RIGHT**, or **BOTTOM** option. This will toggle the X values and the Y values.

Settings for the **X** and **Y** values for the second of the two Mask.

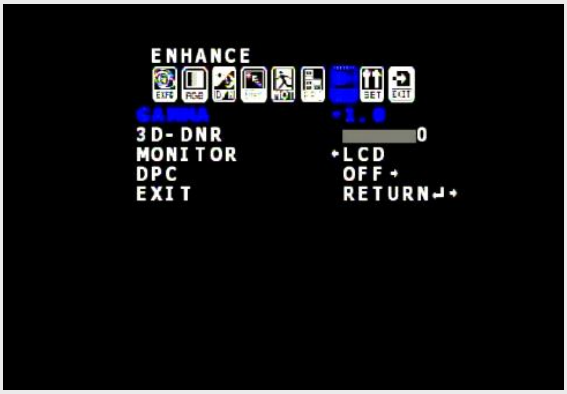


ENHANCE

This feature allows you ENHANCE the image by the use of 4 different options:

- **GAMMA**
- **3D-DNR**
- **MONITOR**
- **DPC**

GAMMA



The **GAMMA** feature gives you 4 values to select: **0.3**, **0.45**, **0.6**, and **1.0**. The smaller the value the brighter the image will appear on your screen. Therefore **0.3** will provide the brightest image and **1.0** will provide the darkest image. Choose the value of **GAMMA** that produces the best image for your monitor.

3D-DNR

3D-DNR is a feature that allows the Micro-EX to internally stack up to 5 images. You select the slider from 0 to 5 to choose the number of images to stack.

Note: you must have a mount that is both aligned well and accurately tracking to get a benefit of this feature. Also note that the camera does not align or register stars, it simply stacks them.

To use this feature set **AGC** (located in the EXPOSURE Menu) to **LOW**, setting the **AGC** to **OFF** disables the **3D-DNR** feature.

MONITOR

This feature allows to select the type of display device you are using either a CRT (old style monitor with a Cathode Ray Tube) or a LCD (computer/HD TV style monitor).

DPC

The **DPC** (**D**ead **P**ixel **C**ancellation) feature when activated will try to eliminate or reduce any hot or warm pixels that appear on the screen. To enable this feature set **DPC** to **AUTO**. To dis-able this feature set **DPC** to **OFF**.

SYSTEM

I would match the above settings, then save them as the default

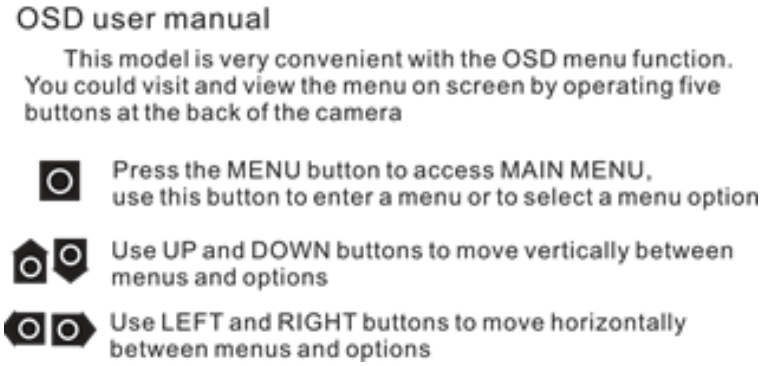
EXIT

This Exit feature provides 3 options for you to Exit the On Screen Menu:

- **Exit -**revert back all changes made in the Menu system and closes the On Screen Menu.
- **SAVE/EXIT –** tis option will save all the changes you have made and will make you're your default for the Micro-Ex. Then it will close the On Screen Menu.
- **INITIALIZE** – this will revert the Micro-Ex to the original factory defaults (use this as a last measure).

Appendix B – On Screen Display (OSD) MAP

EXPOSURE	◆ EXPOSURE	◆ SENSE UP
	◆ AGC	◆ LENS
	◆ BRIGHTNESS	
COLOR	◆ WB MODE	
DAY&NIGHT	◆ MODE	◆ BURST
	◆ DAY&NIGHT	◆ NIGHT&DAY
	◆ DELAY TIME	◆ CDS-START
	◆ CDS-END	
EFFECT	◆ MIRROR	◆ SHARPNESS
MOTION DET	◆ MOTION DET	◆ ALARM MODE
	◆ SENSI TIVTY	◆ AREA SELECT
	◆ MODE	◆ START
	◆ END	◆ OUTPUT TIME
	◆ AUTO ZOOM	
PRIVACY	◆ MASK SELECT	◆ MODE
	◆ COLOR	◆ TOP
	◆ LEFT	◆ RIGHT
	◆ BOTTON	◆ MOVE
ENHANCE	◆ GAMMA	◆ 3D-DNR
	◆ MONITOR	◆ DPC
SYSTEM	◆ COMM ID	◆ TITLE
EXIT		


OSD user manual
This model is very convenient with the OSD menu function. You could visit and view the menu on screen by operating five buttons at the back of the camera
Press the MENU button to access MAIN MENU, use this button to enter a menu or to select a menu option
Use UP and DOWN buttons to move vertically between menus and options
Use LEFT and RIGHT buttons to move horizontally between menus and options

Note: You must use SAVE/EXIT else your changes will revert back when the OSD Menu closes.

Menu

EXPOSURE:

EXPOSURE:	NORMAL/BLC/WDR/HLI
SENSE UP:	OFF/X2/X4/X8/X16/X32/X64/X128/X256/X512 /X1024
AGC:	OFF/LOW/MIDDLE/HIGH
LENS:	ELECTR/DC IRIS
BRIGHTNESS:	0~99

COLOR:

WB MODE:	ATW/AWB/MANUAL/PUSH

DAY&NIGHT:

MODE:	AUTO/DAY/NIGHT/SMART LED
BURST:	OFF/ON
DAY→NIGHT:	0~255
NIGHT→DAY:	0~255
DELAY TIME:	0~10
CDS →START:	0~255
CDS →END:	0~255

EFFECT:

MIRROR:	OFF/HORI/VERT/ROTATE
SHARPNESS:	0~49

Menu

MOTION DET:

MOTION DET:	OFF/ON
ALARM MODE:	OFF/MESSAGE/AREA
SENSI TIVITY:	0~120
AREA SELECT:	1/2/3/4
MODE:	OFF/ON
STARE:	X/Y 0~15
END:	X/Y 0~15
OUTPUT TIME:	0~10
AUTO ZOOM:	OFF/ON

PRIVACY:

MASK SELECT:	1/2/3/4/5/6/7/8
MODE:	OFF/ON
COLOR:	0/1/2/3/4/5/6/7
TOP:	X:29~216 /Y:5~153
LEFT:	X:29~216 /Y:5~153
RIGHT:	X:29~216 /Y:5~153
BOTTON:	X:29~216 /Y:5~153
MOVE:	X:29~216 /Y:5~153

ENHANCE:

GAMMA:	0.3/0.45/0.6/1.0
3D-DNR:	0~5
MONITOP:	CRT/LCD
DPC:	OFF/AUTO

Menu

SYSTEM:

COMM ID:	0~254
TITLE:	OFF/ON(Supports for up to 16 characters.)

Appendix C – Installing the MCV

The MCV-1 and the MCV-1e both come nicely packed in its own see-through packaging. The installation procedures will be the same for either package. The following are the techniques I have used on 4 different computers (3 laptops and 1 desktop). Some are 32 bit and others are 64 bit, all run windows 7. I have not encountered any problems installing this way.

Note

Do some pre-planning to minimize frustration that may occur when Windows gets a bit temperamental. I use both the MallinCam Micro-EX and the MallinCam Signature exclusively with computer control, so I needed to assign one USB port for my video input (MCV) and another USB port for my serial cable (Belkin USB Serial cable). I even label which port is which on my lap-top (just in case I forget). I will always use the same port for each device, so that I will not have multiple versions of the drivers for multiple USB ports (you are just teasing the windows gods if you mix and match, and they will get even).

The MCV-1 and MCV-1e are heavy and depending upon your computer's manufacturer, the MCV may put some strain on the USB port. Therefore I use a small 6" USB cable extender, and plug the extender into the USB port for and plug the MCV into the other end of the extender.

Step 1

Open the Package

When you open the package you will find:

- 1 mini CD
- 1 User's Manual
- MCV-1 (1e) Do not inset this into **USB port** until instructed

• **Take the instruction booklet and the mini CD and place them on the table. If your computer cannot handle a mini CD (***you cannot physically lock the CD into the centre hole of the CD drive***), then you can down load the software by following the next step**

• **Go to the MallincamUSA website and download the latest drivers for the MCV device:**

http://www.mallincamusa.com/Files/MVC-1%20Software%20CD.zip

This file is in a zip format, so you will need to unzip the file.
You should see 5 folders and about 4 other files inside the unzipped folder.

Step 2 ***Insert the MCV-1 or MCV-1e***

*Remember the **USB port** you choose for the **MCV**; you will always use this **USB port** for the **MCV**.*

- The **Windows** will find new hardware and will attempt to load drivers. It will most likely fail on one driver. Don't worry that is why you have the driver installation software.
- Either insert the **CD** or run the program **autorun.exe** in the folder of the file you downloaded.
- When you see the green **USB 2.0 HD HV Grabber** screen, CLICK on the option: **Install Drivers**.

- You may receive a **Windows** warning asking you if you want to allow the installation to run, Click **Yes**.
- Follow the instructions on **the Installation of USB Video/Audio Device Driver** Wizard that is displayed on the desktop.
- The installation takes under a minute. Once complete, you will be presented with a notification windows, click **Finish** with the "**Yes, I want to restart my computer now**" option selected.
- The computer will restart. Login in as you normally would.
- You don't need to install any of the other files from the **HD AV Grabber** installer.

Step 3 ***Checking out the MCV-1 or MCV-1e***

It is always a good idea to check out the **MCV-1e** to see if it is running correctly after you have done a first time installation.

- Start the **Image** software that you will using to display your Micro-EX Video image such as: AmpCap, SharpCap, VirtualDub,..)

- In the **Video Device** menu, you should see a **Video Source** called "**USB 2828x Device**". This is the driver for either the **MCV-1** or **MCV-1e** device. This is the one we want. Select it
- Power up your Signature, and you should be able to see the camera's images on the video window of your software.

Oh No, the video is not working correctly, strange stuff is happening and it is not my camera

After you have checked all of the obvious: Power to the Micro-EX, Software (AMCAP) is pointing to the correct input device on the MCV (remember it has 2 connection types: RCA and SVIDEO).

- Down load the updated **MCV-1** or **MCV-1e** driver from the Mallincam Software Links Site:

  I have put a copy here on my own site of the latest driver called:

  BDA_UAC_WHQL_082311_Setup.rar

  My file location: http://sdrv.ms/Lb3wV3

  Note this is a **RAR** file, and you will need a free **RAR** extractor program to unzip this file. A good free **RAR** extractor is called: **7-Zip**

Appendix D – Installing RS485 Communications

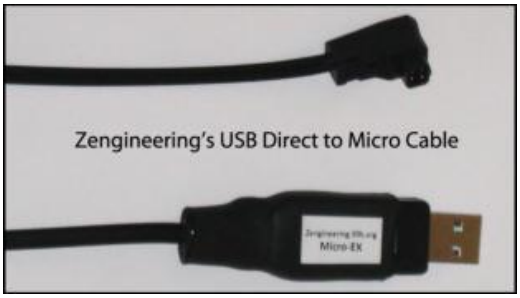
RS485 Communications

There are two ways to connect your computer to the Mallincam Micro-EX. The first way is through a USB direct to MallinCam Micro-EX cable, and the second way is through a connection path USB to RS232 Serial Adapter -> RS232 to RS485 plug -> Micro EX RS485 cable. Either technique works well, and the method of choice depends upon your preference. For more information visit either The Mallincam Website (www.Mallincam.net) or the Zengineering Website (www.http://zengineering.us/.

USB Direct to Mallincam Micro-EX cable

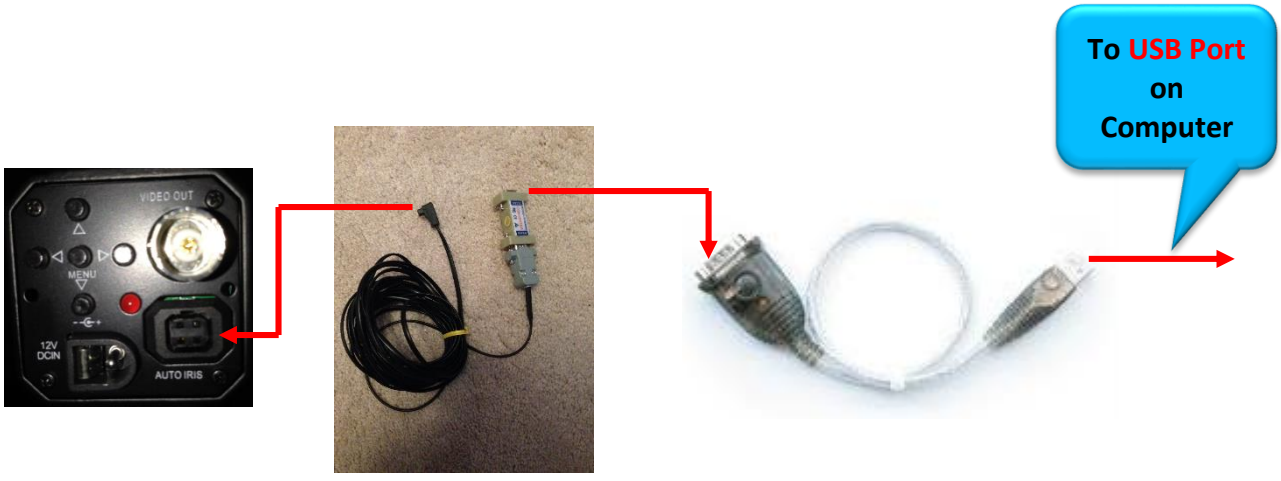
This may be the easiest way to communicate between the Micro EX and your computer.

- Install the drivers that came with the product.
- Plug in the cable.
- Visit the Device Manager in Windows to check what Com Port the cable will use.
- Match the Com port on Stephane's Micro-EX
- Connect and use.



Using a USB to RS232 Adapter

Most of us already have a USB to RS232 Adapter, so this connection path will be the one you may end up using so detailed instructions are provided.



The USB to RS232 Adapter
To control the camera through the Micro-EX RS485 Port you will require a way to communicate through a USB Port on your computer. This is done through a RS232 Adapter Cable.

The ideal **USB to RS232 Adapter** is usually computer specific (and sometimes Operating system specific).

When you purchase a USB to RS232 adapter, purchase a brand name one that specifically states that it is 100% compatible with your operating system. There are some cheap prolific chip set knock offs that are incompatible with updated drivers (Error -10 (failure to load drivers). MallinCam users have had no issue with USB to RS232 Adapters with the FTDI chipset.

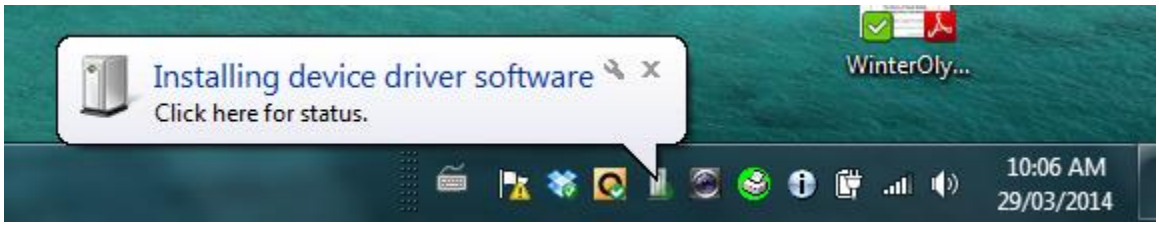
On the Macintosh, excellent results with adapters from Tripplite (formerly Keyspan), IOGear, FTDI and TrendNet, since these manufactures provide up-to-date drivers compatible with most versions of Mac OS X

Step 1

Installing the USB to RS232 Adapter (Windows 7/8 Specific)
Most USB to RS232 Adapters come with a CD that contains the driver for the adapter. I recommend using that CD as a last resort, as Windows Operating system (Windows 7, Windows 8, Windows 8.1) usually goes a fine job in automatically downloading the latest drivers for your adapter.

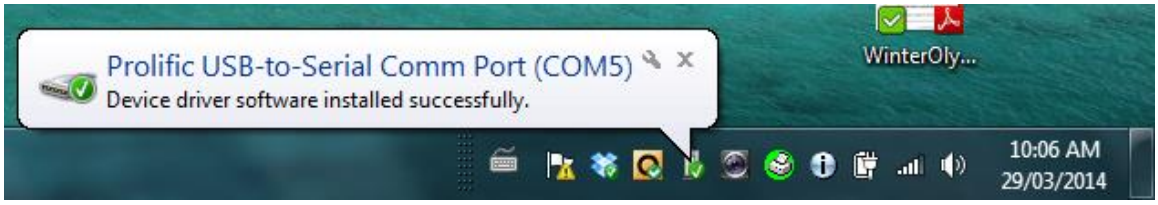
Insert you USB to RS232 Adapter into a free USB Port on your computer

Windows will beep to recognize that an adapter has been inserted into a USB Port. After a few seconds the following message singular to the one below should appear on the bottom right of your Windows screen.



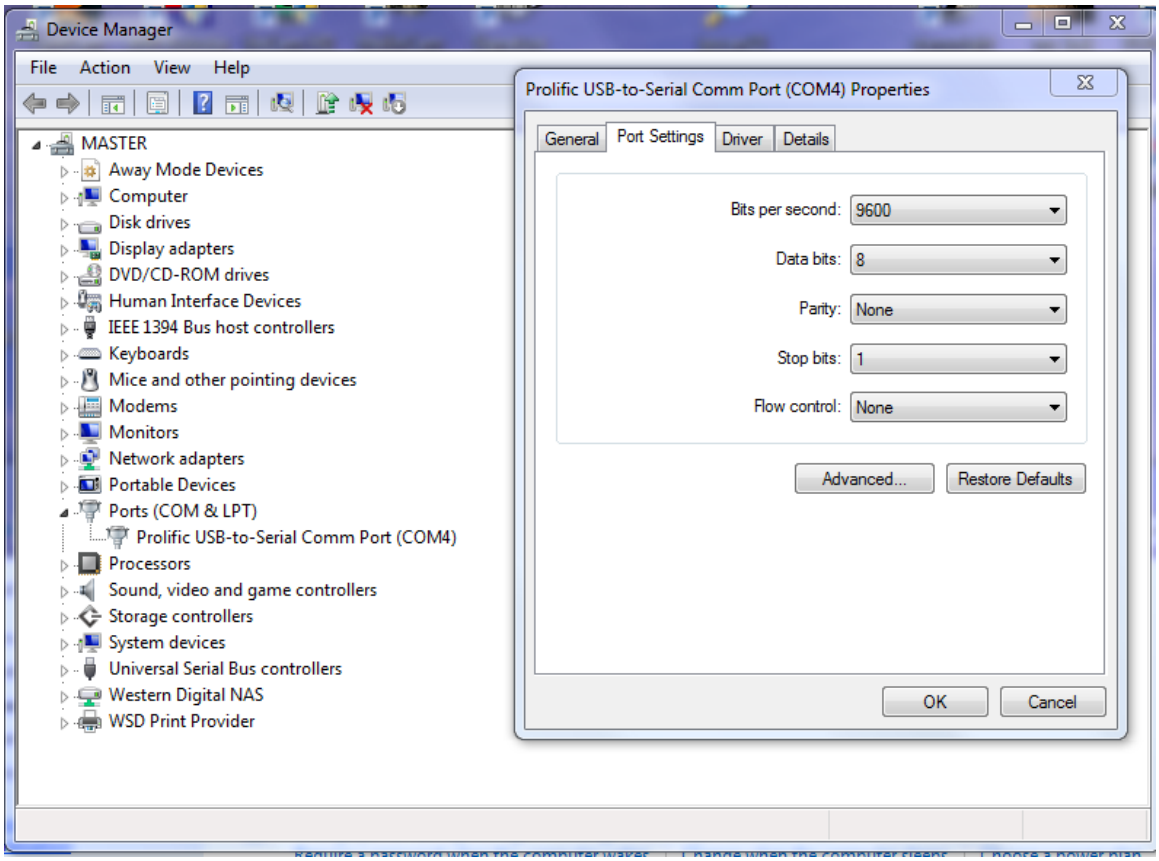
The little green shade will move around the icon that the Installing device driver software message is pointing to while the driver is being installed (may take about a minute).

Once completed, the following pop-up message should appear (name of driver may be different, depending upon which USB to RS232 adapter you are using)



The driver has been successfully downloaded and installed. Make note of both the Port that you have used for your USB to RS232 Adapter (you should always use the same Port) and what COM value Windows has assigned for this adapter (5 in image above).

As a fast check to ensure everything is setup correctly, go into the **Device Manager** on Windows and ensure that your adapter has the same settings as below (COM Port number may be different)



Oh No, Driver did not install correctly.
Sometimes the Window's gods are having a bad day and they decide to take it out on you. Don't Panic. If you check the **Ports (COM & LPT)** or **Other devices** list

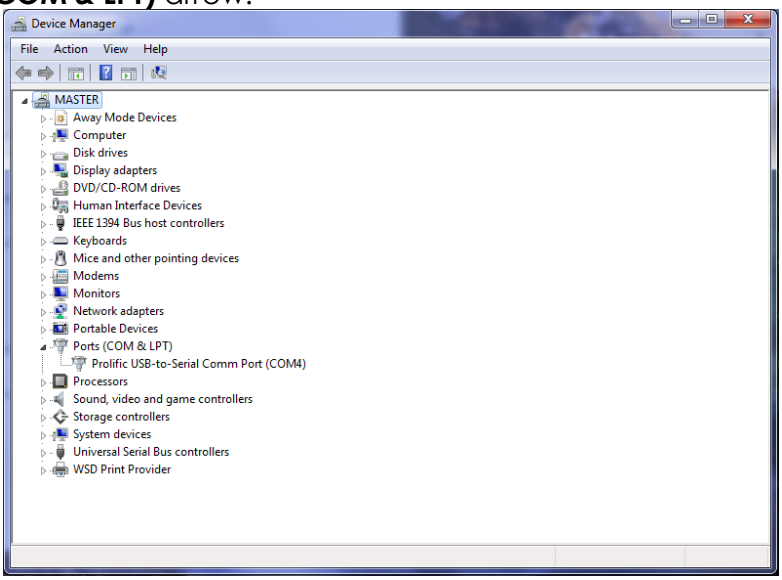
item in the **Device Manger** from the **Control Panel**, you may see a yellow warning beside the Adapter, this indicates the current driver is incompatible.

There could be many reasons for the driver not to install, the most common being that there already is an old incompatible driver already in the system, or Windows could not locate the driver for you particular USB to RS232 Adapter.

Check to see if you already have a driver installed and remove it if necessary from your system.

With the USB to RS232 Adapter still inserted in a USB Port.

➔ From the **Control Panel**, go into the **Device Manager**, and click on **the Ports (COM & LPT)** arrow.



➔ Right Click on the driver name (*Prolific USB-to-Serial Com Port (Com4) in my image above*) and Choose **Uninstall** when Pop-up List appears.
➔ Let Windows do its uninstall thing and when completed, remove the USB to RS232 Adapter from the Port.

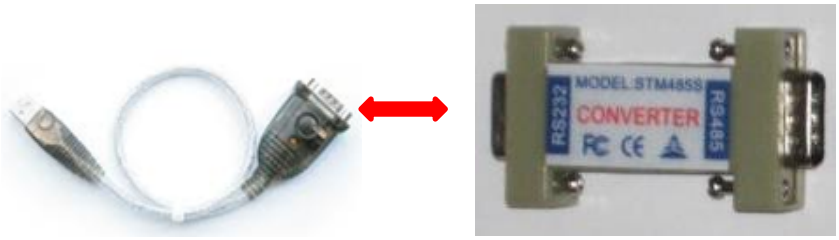
Download and install latest driver specifically for your Device (or use the installation CD that came with the Adapter)

➔ Now visit the site of the USB to RS232 Adapter you own and download the latest driver and follow the installation instructions from the site. (*If you are using the CD, follow the instruction that came with the Adapter*).
➔ The Final step in either the download or CD option you chose will be to reinsert the USB to RS232 Adapter back into you USB Port, and windows should finish the installation process and then display success popup menu with the COM Port it has assigned to your Adapter.

Step 2

Connect the USB to RS232 Adapter to RSR232/RS485 Connector

You now need to connect the **RS232 Adapter** to the RS232 end of the **RS232/RS485 Connector** that came with your kit. It will only connect one way.

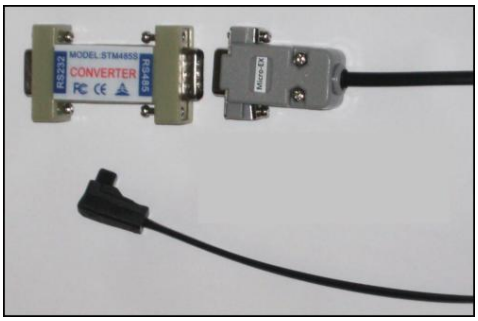


RS232 Adapter **RS232/RS485 Connector**

Step 3

Connect the Micro EX to the RS232/RS45 Connector

Now connect the RS485 end of the **RS232/RS485 Connector** to the **provided Micro Ex Cable** and insert the IRIS end of the cable into the IRIS port on the back of the Micro-EX. Your communications path is now complete and you should be able to control your Micro EX through software.



As mentioned in the Connecting Micro EX to Computer section. You must ensure that the Micro EX has the **COMM ID** is set to **1** and that this is saved as the default for the camera.

Appendix E – Accessories for the Micro-EX

Upscaler

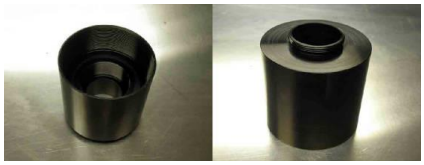
Digital View Finder

Digital View Finder Kit

8" Monitor

12" and 15" Monitor

2" c-mount adapter



MCV-1 (MCV-1-E)

Appendix F – First Aid for the Micro-EX

The Image from the Micro-EX is jumping all over the place

Diagnosis: The camera is not getting a proper video signal.

Cure: Check to make sure that the video cable is snuggly connected from the Micro-EX to the Computer.

The Software Does not Control the Micro-EX.

Diagnosis: The computer communication settings do not match that of the Micro-EX.

Cure: Ensure that the correct connections are made between the Micro-EX and the computer. Make sure that both the computer and the Micro-EX are communication at 9600 Baud. Make sure that both the computer and the Software are using the identical com Port number. Make sure that the Micro-EX is set to **COMM ID: 1** and that this is the default by issuing a **SAVE/EXIT** from the Micro-EX **O**n **S**creen **D**isplay.

When I have my Video Software connect to my Mallincam through my MCV-1 adapter I only see a Blue screen.

Diagnosis: The MCV-1 or other adapters can have multiple video input connections. For example the MCV-1 has both composite and S-video. The cause of this symptom is that MallinCam is looking at one of those input ports, while the camera is sending the image through the other. Your Video Display software then just gives a Blue screen to say that I see nothing at the MCV-1 source.

Cure: Set the video to use the Composite port on the x2828 (MCV) video driver. Note: Miloslick/Splitcam/AmCap can change the port choice of the MCV-1. Just go into the **Video Tab** and in the Drop Down list choose **Video Input**. Inside this drop down will be the choice of input ports.

My MallinCam is frozen, or the commands do not seem to be working correctly, the camera is acting strangely.

Diagnosis: Somehow the MallinCam internals have become corrupted (power surge, static, cosmic ray) and all we need to do is reset everything back to factory settings.

Cure: The first thing you should do is turn off MallinCam for about 30 seconds, then power it up as you normally would (this fixes about 95% of the issues). If this didn't help, you can reset the MallinCam Micro-EX to its Initial Factor Settings by following this sequence:

- Press the **Center Button** so the Menu appears.
- Select the **EXIT** Option
- Now Select the **INITIALIZE** option and press the **Centre Button**

Appendix G – Suggested Item Specific Settings

Fantastic work from Jim K (SkyGazer)

Menu / Parameter	Deep-Sky brighter objects	Deep-Sky dimmer objects	Solar Ha See Note	Moon/Wht Lt Sun See Note	Planets bright comets	*as of: 19 Mar'14* Comments
1. Exposure						
Exposure	Normal	Normal	**WDR (or HLI)**	**WDR**	Normal	*HLI dims bright areas*
Options	- - -	- - -	On (HLI = 40)	On	- - -	WDR Auto=0-20 / HLI=0-40
Sense Up	Off	Off	Off	Off	Off	*Rarely Changed*
AGC	Off	**Low**	Off	Off	Off	
Lens	Electric	Electric	Electric	Electric	Electric	*Not to be Changed*
Speed*	**X128**	**X512**	**1/10,000 - 1/2000**	**1/10,000 - 1/4000**	**1/1000 - 1/60**	**Depends on Optics/Object**
Brightness	~ 40	~ 40	~ 40	~ 40	~ 40	*(0 - 99) Rarely Changed*
2. Color (RGB)	ATW (auto)	ATW (auto)	ATW (auto)	ATW (auto)	ATW (auto)	(Manual, AWC to capture/freeze)
R(-Y)/B(-Y)	- - - / - - -	- - - / - - -	- - - / - - -	- - - / - - -	- - - / - - -	*(0 - 255 if adjusting needed)*
3. Day & Night	Day (color)	Night (bw)	Night (bw)	Night (bw)	Day (color)	*(use only Day - Night - Auto)*
4. Effect						
Mirror	*As Needed*	*As Needed*	*As Needed*	*As Needed*	*As Needed*	*(Off - Hor - Vert - Rotate)*
Sharpness	~ 10	~ 10	~ 20	~ 20	~ 20	(0 - 49)
5. Motion	- - -	- - -	- - -	- - -	- - -	*Not Used/Not to be Changed*
6. Privacy	- - -	- - -	- - -	- - -	- - -	*Not Used/Not to be Changed*
7. Enhance (Sys)						
Gamma	1.0	1.0	1.0	1.0	1.0	0.3 = bright / 1.0 = dark
3D-DNR	- - -	***As Needed***	- - -	- - -	- - -	(0 - 5 stacked frames)
Monitor	*As Needed*	*As Needed*	*As Needed*	*As Needed*	*As Needed*	*(CRT-LCD) Rarely Changed*
DPC	Off	Auto	Off	Off	Off	*for auto hot pixel correction*
8. System (Set)						
Comm ID	1	1	1	1	1	*0-254 (As needed for cable use)*
RS-485	Pelco-D	Pelco-D	Pelco-D	Pelco-D	Pelco-D	*Not Changed (for cable use)*
Baudrate	9600	9600	9600	9600	9600	*Not Changed (for cable use)*
Title	*As Needed*	*As Needed*	*As Needed*	*As Needed*	*As Needed*	(up to 16 characters)
Language	English	English	English	English	English	*Change if Needed (to Chinese)*
Sync	Internal	Internal	Internal	Internal	Internal	*Not to be Changed*

Menu Parameter			Comments
1. Exposure			
Exposure			
Options			
Sense Up			
AGC			
Lens			
Speed			
Brightness			
2. Color (RGB)			
R(-Y)/B(-Y)			
3. Day & Night			
Setting			
4. Effect			
Mirror			
Sharpness			
5. Motion			
6. Privacy			
7. Enhance			
Gamma			
3D-DNR			
Monitor			
DPC			
8. System (Set)			
Comm ID			
RS-485			
Baudrate			
Title			
Language			
Sync			

Another Great Template from Jim K (SkyGazer)

OBJECT		OBJECT	
DATE		DATE	
CONDITIONS:		CONDITIONS:	
TELESCOPE (Aperture / FL)		TELESCOPE (Aperture / FL)	
Reducer / Barlow		Reducer / Barlow	
Spacer Rings		Spacer Rings	
Filter Used		Filter Used	
EXPOSURE	Normal / WDR= / HLI=	EXPOSURE	Normal / WDR= / HLI=
Sense Up	Off	Sense Up	Off
AGC	Off / Low / Medium / High	AGC	Off / Low / Medium / High
Lens (Electric) Speed		Lens (Electric) Speed	
Brightness		Brightness	
COLOR (RGB)	ATW / ATC / Manual R= B=	COLOR (RGB)	ATW / ATC / Manual R= B=
DAY & NIGHT	Day (color) / Night (bw) / Auto	DAY & NIGHT	Day (color) / Night (bw) / Auto
EFFECT - Mirror	Off / Hor / Vert / Rotate	EFFECT - Mirror	Off / Hor / Vert / Rotate
Sharpness		Sharpness	
ENHANCE - Gamma	0.3 / 0.45 / 0.6 / 1.0	ENHANCE - Gamma	0.3 / 0.45 / 0.6 / 1.0
3D-DNR		3D-DNR	
Monitor	CRT / LCD	Monitor	CRT / LCD
DPC	Off / Auto	DPC	Off / Auto
COMMENTS:		COMMENTS:	

OBJECT		OBJECT	
DATE		DATE	
CONDITIONS:		CONDITIONS:	
TELESCOPE (Aperture / FL)		TELESCOPE (Aperture / FL)	
Reducer / Barlow		Reducer / Barlow	
Spacer Rings		Spacer Rings	
Filter Used		Filter Used	
EXPOSURE	Normal / WDR= / HLI=	EXPOSURE	Normal / WDR= / HLI=
Sense Up	Off	Sense Up	Off
AGC	Off / Low / Medium / High	AGC	Off / Low / Medium / High
Lens (Electric) Speed		Lens (Electric) Speed	
Brightness		Brightness	
COLOR (RGB)	ATW / ATC / Manual R= B=	COLOR (RGB)	ATW / ATC / Manual R= B=
DAY & NIGHT	Day (color) / Night (bw) / Auto	DAY & NIGHT	Day (color) / Night (bw) / Auto
EFFECT - Mirror	Off / Hor / Vert / Rotate	EFFECT - Mirror	Off / Hor / Vert / Rotate
Sharpness		Sharpness	
ENHANCE - Gamma	0.3 / 0.45 / 0.6 / 1.0	ENHANCE - Gamma	0.3 / 0.45 / 0.6 / 1.0
3D-DNR		3D-DNR	
Monitor	CRT / LCD	Monitor	CRT / LCD
DPC	Off / Auto	DPC	Off / Auto
COMMENTS:		COMMENTS:	

Appendix H – Notes